School Shop

vol. 1 no. 6

March, 1942

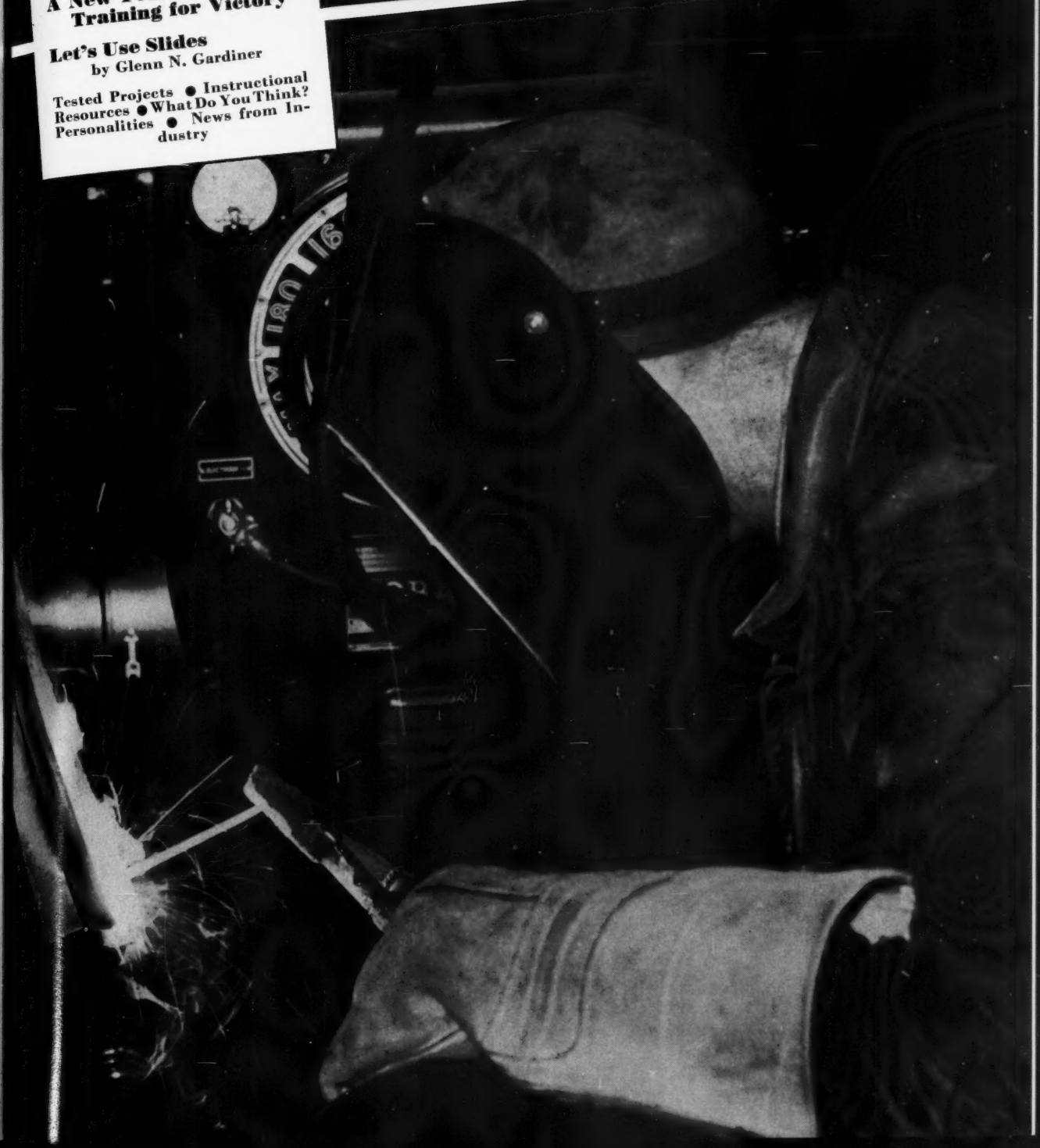
Baltimore's Occupational Schools
by Stanley J. Pawelek

An Efficient Shop-Made Belt Sander
by Marshall L. Byrn

A New Feature: Shop Training for Victory

Let's Use Slides
by Glenn N. Gardiner

Tested Projects ● Instructional Resources ● What Do You Think? Personalities ● News from Industry



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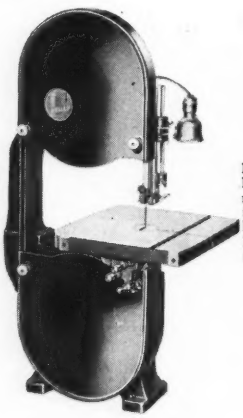

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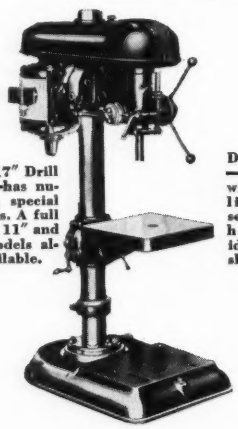

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School Shop

FOR INDUSTRIAL ARTS & VOCATIONAL EDUCATION TEACHERS

CONTENTS

March, 1942
Vol. I, No. 6

Baltimore's Occupational Schools. Stanley J. Pawelek 2
How one city supplies education to "all the children of all the people."

Project of the Month: An Efficient Shop-Made Belt Sander. Marshall L. Byrn 4

Shop Training for Victory: The Record to Date. N. A. Burnell, 2nd 6
A new SCHOOL SHOP monthly feature devoted to the defense-training program.

Let's Use Slides. Glenn N. Gardiner 8
Using the camera to prepare teaching aids.

What of the Future? Earl G. Darby 9
Manhattan, Kansas, has a guidance program in which industrial education plays an important part.

TESTED INSTRUCTIONAL PROJECTS—
These projects have all been tested in school situations and found useful in shop teaching.

Lathe Centering Device. Clifford L. Yard 11

Modernistic Table. R. J. Coltharp 12

Folding Drawing Stand. Isadore M. Fenn 13

Strap Metal Smoking Stand. Einar E. Siro 14

Nail Keg to Lawn Table. Delmar W. Olson 14

News 15
Items concerning the school shop world.

In the Morning Mail 17
Comments from readers.

Transparent Models in Teaching Drafting. F. N. Newton, Jr. 18
How to make your own models.

News from Industry 19
New products; new equipment; and industrial advancements.

Test in Bench Metal Work. G. B. Westerberg 20
Designed to test manipulative skills.

Mechanical Drawing + Psychology. Kenneth Maxwell 21
Making allowances for differences in ability.

What Do You Think?—What relationship do you have with organized labor in connection with your trade-training program? 22
Explanations from directors of vocational education.

Personalities 22

Mathematics for Woodworkers. Wilbur D. Hopkins 23
A teaching unit on estimating quantity and cost of materials.

Instructional Resources: Books, Pamphlets, Visual Aids 24
Listings in easy form for clipping and filing.

Index to Advertisers 24

School Shop is published monthly, September through June, at Ann Arbor, Michigan. Manuscripts are paid for at regular space rates and should be addressed to the Editor, School Shop, Box 100, Ann Arbor, Michigan. Subscription rates to libraries and institutions, $2.00 a year; Foreign and Canadian, $3.00 a year. 25 cents a copy. Printed in the U. S. of A.

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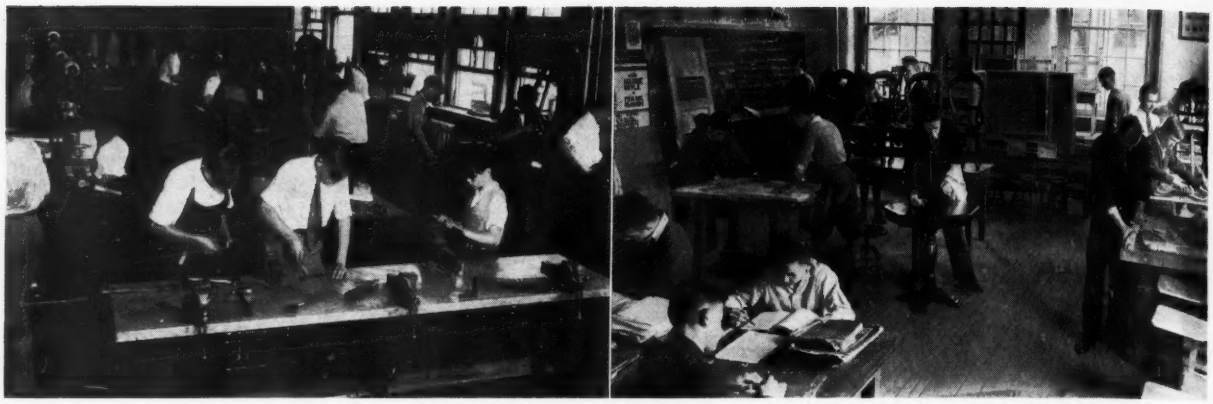
Advertising Representatives: Eastern—Macfarland and Heaton, 289 Fourth Avenue, New York City, Gramercy 5-2380; Mid-West—Macintyre and Simpson, 75 East Wacker Drive, Chicago, Central 1715, and 1900 Euclid Avenue, Cleveland, Ohio, Cherry 1501.



Left: Machine shop and bench metalwork for future machinists. Right: Refinishing furniture, an important phase of painting and decorating class.

Baltimore's Occupational Schools

• *by* STANLEY J. PAWELEK

Baltimore, Maryland, has developed its occupational schools in answer to the obligation of public schools to provide education "to all the children of all the people." This description shows the successful operation of the plan. Stanley J. Pawelek is Supervisor of Industrial Education, Baltimore City Schools.

THE function of education in a democracy is to provide opportunities for each individual to develop himself to the highest level of his ability. It is trite to state that individuals differ. A truly effective school system must assist each pupil to discover his abilities and aptitudes and provide educational programs suited to the needs of all.

It is a well established fact that many students have neither the ability nor the disposition to pursue strictly "academic" curriculums in the schools. Because of a host of personal, social, and economic reasons, many are always retarded in the traditional program. Still others experience difficulties of social and emotional adjustments, thereby becoming "problems" to teachers and fellow students alike.

The Baltimore public-school organization is wholeheartedly committed to the philosophy of providing appropriate educational services "to all the children of all the people." Such a philosophy, to be functional, imposes on its proponents the task of constructing multiplex curriculums and courses of study. This, Baltimore has done. The needs of the boys and girls in the junior and senior high schools have been adequately met with a variety of curricular patterns. The physically and mentally handicapped pupils likewise enjoy educational opportunities designed for their particular demands. For those others whose interests and abilities are aligned more closely with preparation for early entrance into gainful employment, another program has been evolved. This is a four-level vocational education plan culminating in some marketable skill on the part of the students. The four levels, briefly described, are as follows:

Level 1—Occupational Schools and Classes.—These are designed for boys and girls who are at least 13 years of age, and who can read and do arithmetic at a fifth-grade level or above. The minimum I.Q. for admission is approximately 80. The majority of the pupils enter from the fifth and sixth grades. Parents' permission is one of the prerequisites for enrolment.

Level 2—Advanced Occupational Schools.—These afford an opportunity for those pupils who make commendable progress in the shop and academic subjects of the Occupational Schools, and are ready to be promoted. Some, with average or high mechanical aptitude, may go directly into these schools from the sixth grade. Others may come from the seventh grade, and still others with low mechanical aptitude, but showing a high degree of interest, may enter from the eighth.

Level 3—General Vocational Schools.—These are for boys and girls from the eighth or ninth grade who are at least 14 years of age. Those with average or high mechanical aptitude, but with only seventh-grade completion, can usually succeed here. Students of higher grade levels, but of low mechanical aptitude may enter and receive considerable benefits. Outstanding students from the Occupational Schools are promoted to these schools.

Level 4—Vocational Schools.—These represent the senior level of the vocational education program. Students seeking entrance must be at least 14 years of age, preferably 15 or 16; show evidence of high mechanical, artistic, or clerical aptitude; and ninth-grade completion. Boys and girls of unusual aptitudes may be admitted from the lower grades, or promoted from the General Vocational Schools.

As may be readily seen, from the above descriptions, the entire plan is extremely flexible, not rigid. Each individual student is considered in the light of his own needs and merits. Minimum standards are observed, in the majority of instances, but the undergirding philosophy of *educational service to all boys and girls* remains intact. Entrance into the vocational program does not necessarily preclude the return to the academic, should this eventually appear to be the more desirable procedure.

The Occupational Schools and Classes

The foregoing paragraphs were an attempt to show how the Occupational Schools fit into the entire educational scheme. They are, as far as is known, unique. In their 14 years of operation in Baltimore, they have rendered an outstanding service to its youth. Far from becoming a "dumping ground" for those

unfit for the traditional school program, they have provided a truly functional education for thousands of boys and girls. For some they provide a terminal educational service. For many others they are the first "rung" in the vocational "ladder" leading up to graduation from the senior vocational schools and ultimate employment in some skilled trade. They might well be considered the elementary schools of the vocational program.

Subjects Taught

In Occupational Education, there are separate classes for boys and girls. The program provides for a six-hour day. Three of these are spent in the study of related subjects, closely coordinated with the practical work carried on in the the shops and homemaking activities. The other three hours are spent in the shops and workrooms where pupils are taught certain manipulative skills. The following is a somewhat detailed "picture" of the subjects taught: (The subjects marked with asterisks are offered in advanced classes only.)

Related Subjects
(For all pupils)

Reading	History
Arithmetic	Geography
English	Science
Handwriting	Spelling
Physical Education	Art
Music	

Practical Subjects

Boys	*Girls*
Woodwork	Clothing
Sheetmetal	Cookery
Bench metalwork	Household management
Art metal	Child care

Boys
Drawing
*Electricity
*Leatherwork
*Painting and decorating
*Mechanical assembly
*Tailoring
*Machine shop
*Junior commercial

Teachers

The requirements for teaching in the occupational schools are essentially the same as those for the vocational schools. The typical teacher in this program is a mature person having had considerable practical experience, and in addition, at least 240 hours of professional education in an accredited teacher-preparing institution. Many have completed enough college work to receive a baccalaureate degree. Some of this group have thus made themselves eligible for junior and senior high-school teaching positions.

Shopwork for Boys

There are 14 boys' occupational schools and classes in the city. These are taught by approximately 30 teachers, both shop and related. The shops are, in the main, of the *unit* type, although several *general* shops may be found.

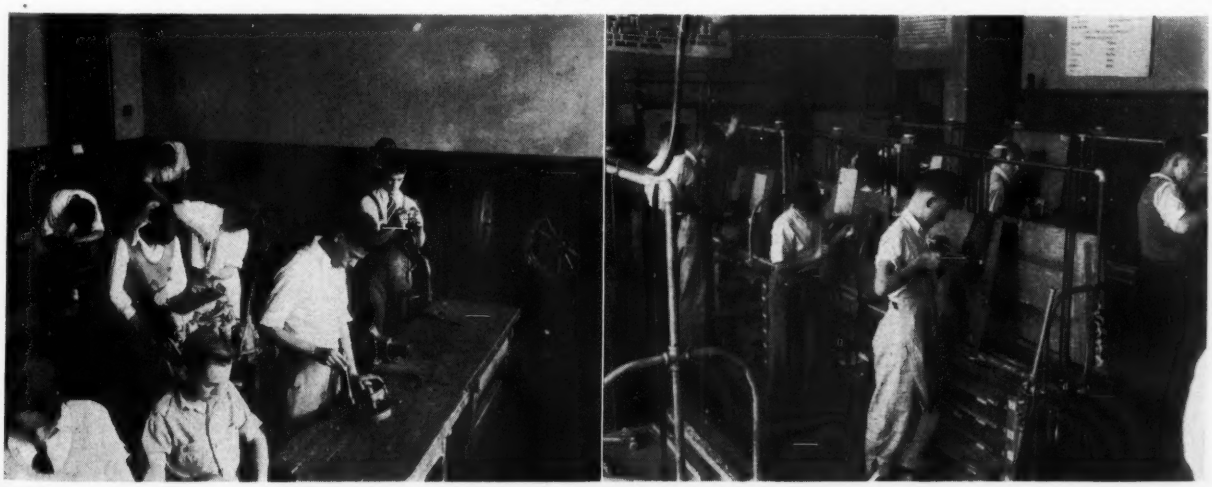
The methods of instruction, along with class organization, are not unlike those in the ordinary junior high schools. The quality of the work done by the boys compares favorably with that of junior high-school industrial arts.

The Objectives

1. To provide an opportunity for the discovery of interests and abilities in activities other than strictly academic. (Exploratory.)
2. To develop a degree of skill necessary for employment in certain industrial and commercial occupations.
3. To provide a degree of skill in the activities involved in the maintenance of a home.
4. To develop certain desirable attitudes, character and personality traits necessary for good citizenship.
5. To vitalize the study of the traditional school subjects, and to develop skills in the fundamental processes in a more functional manner.
6. To provide an opportunity for a better appreciation of how the world's work is done.
7. To develop a wholesome respect for work, and for those engaged in other than the "white-collar" jobs.

● Syracuse, N. Y., has instituted a plan whereby students in regular school attendance can also enter defense-training courses and secure the necessary skills to find immediate employment on graduation. The program, which has been worked out by Donald M. Kidd, Director of Vocational Education, consists of three-hour daily classes conducted from three to six. It is called the "Junior Training Program" and is open to all boys who have reached their seventeenth birthday. Regular students may elect to take the one subject of their choice and are given 15 hours of training each week —12 hours of shopwork and three hours of blueprint reading and shop mathematics. Mr. Kidd states that "a boy can enter our defense classes without interfering with his regular daily school program, be graduated from his home school, and have the necessary skills to find immediate employment."

Left: Mechanical assembly for future factory workers. Right: Electrical practice, one of the more popular subjects.



Project of the Month:

An Efficient *Shop-Made* Belt Sander

by Marshall L. Byrn

This belt sander makes an excellent general shop project since it involves many types of shop work from drawing to woodworking to plumbing to machine shop. Marshall L. Byrn is head of the Industrial Arts Department in the University High School and Assistant Professor of Industrial Arts, University of Michigan, Ann Arbor.

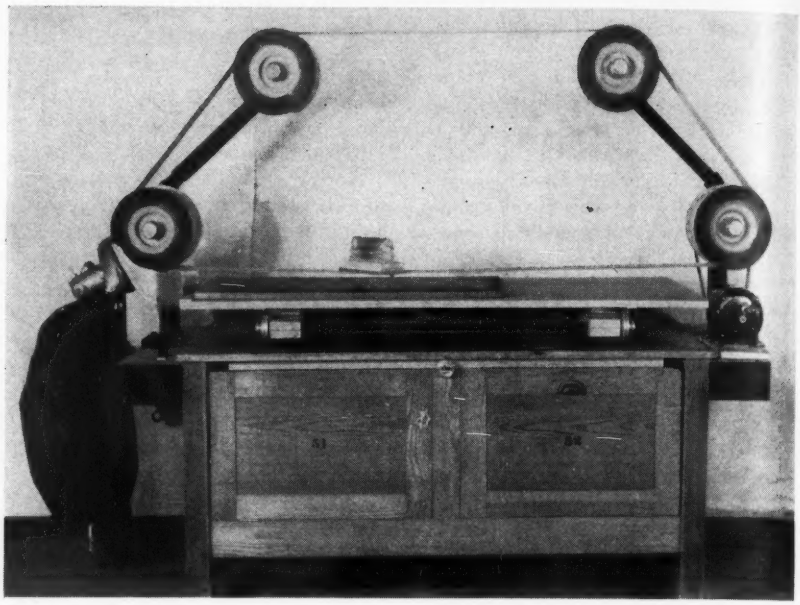


Illustration 1

EVERY woodshop instructor and general shop teacher who does much woodworking would like a good belt sander. However, the cost is prohibitive in most cases unless a great deal of production work is done for the school such as making special furniture, tables, etc. This economically made sander was designed and built several years ago. It has been very efficient, even to the dust collector which was made from an old vacuum cleaner.

The sander is easily built and offers a fine opportunity for the boys to help design and build the various parts. As the drawings and photographs show clearly all of the details and how the parts are assembled, this phase of the project will not be discussed here.

When this sander was built, our shop did not possess a welding outfit but did have excellent equipment for doing plumbing, so we used pipe fittings. If we were to construct a new one, I would weld up the frame using channel iron about four or five inches wide.

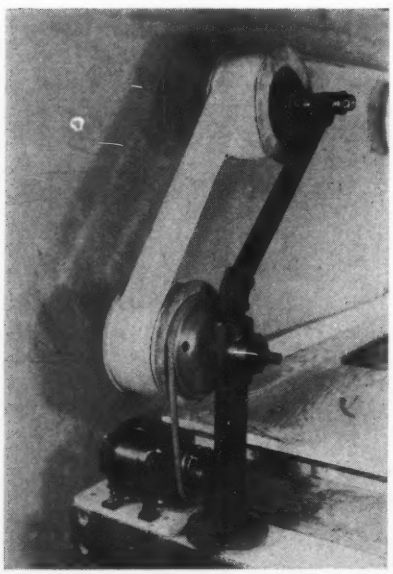
We made patterns and cast the carriage rollers and v-pulley using scrap crankcase and piston aluminum. By using Falls Aluminum Flux, Niagara Falls Smelting and Refining Co., Niagara Falls, N. Y., we made castings that were entirely pinhole free. It is necessary, however, to follow instructions very carefully. With the present scarcity of aluminum, old die-cast metal could be used just as well. It has the added advantage of melting at a lower temperature. Die cast can be salvaged from old vacuum cleaners and junk automobile hardware.

This job is very well adapted to the work found in most general shops since it involves several types of work such as woodworking, hand-tool work in metal, casting and machining the parts, and the use of several types of plumbing materials.

Illustration 1 shows clearly how we mounted the sander on an old laboratory table that came out of one of the chemistry laboratories on the campus. Illustration 2 shows the drive-end details very clearly. The bill of materials gives the names and sizes of the pipe fittings needed. We found that a one-third or one-half horse power motor should be used.

Illustration 3 shows the tension-spring end of the sander, including the hinged tension lever, the method of using an old vaccum cleaner as a dust collector, and the pressure block with a ⅜″ felt base. The tension spring was an old truck brake-release spring.

Illustration 2

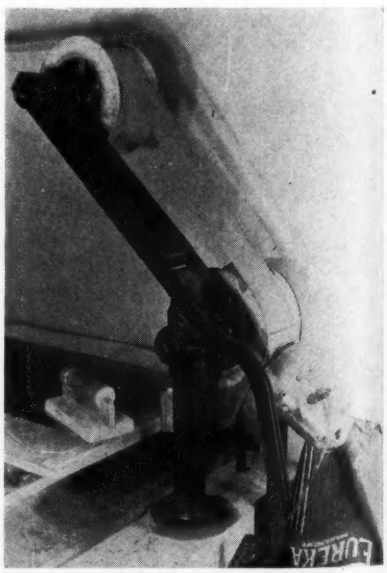


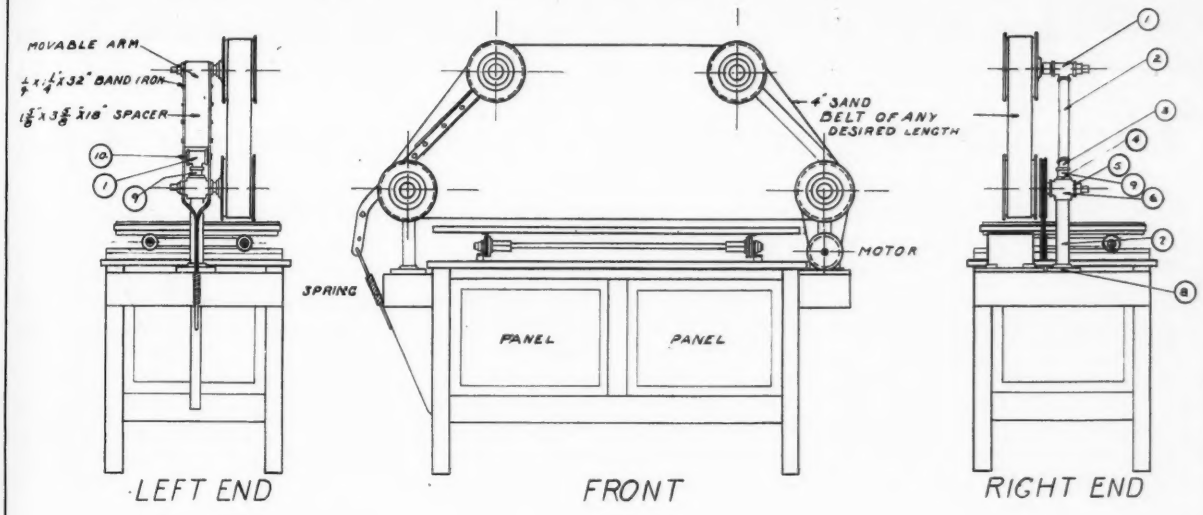
Bill of Materials

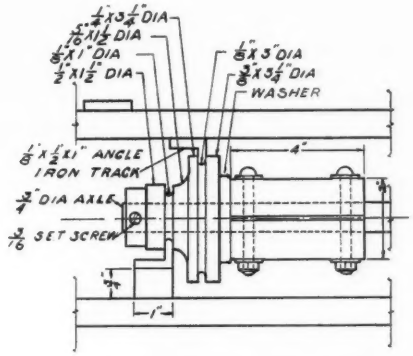
(See drawing for identifying numbers)

1. 1″ x 1″ x 1¼″ tee.
2. 1¼″ x 17″ pipe.
3. 1¼″ 45° elbow.
4. 2″ to 1¼″ reducing bushing.
5. 2″ to ½″ reducing bushing.
6. 2″ cross.
7. 2″ x 13½″ pipe.
8. 6″ steam flange.
9. 1¼″ close nipple.
10. 1″ plug, drilled for ⅜″ bolt.

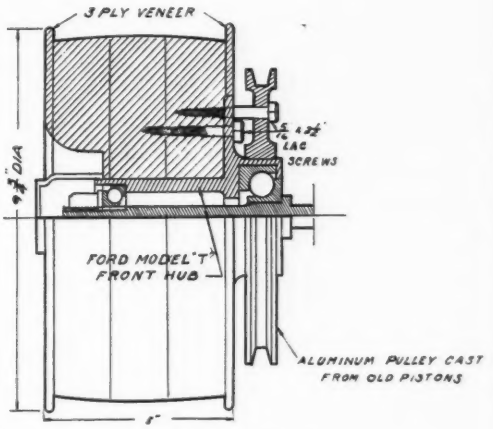
Illustration 3



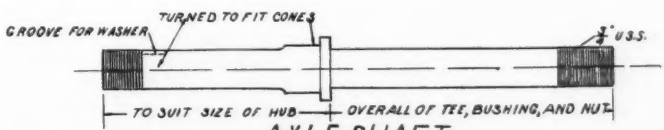




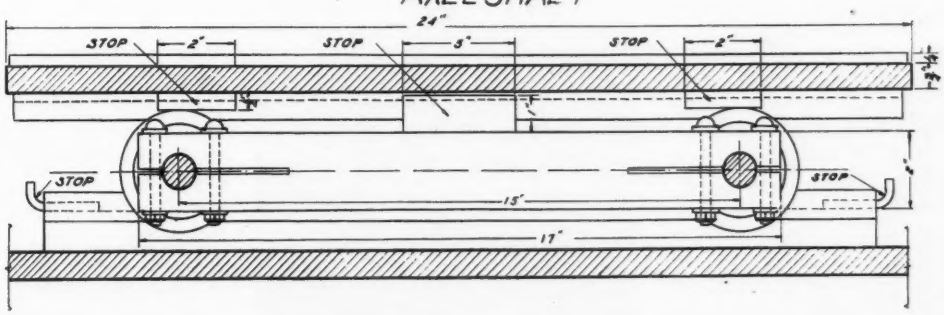
DETAIL OF TRACK AND CARRIAGE ROLLERS



1/4 SECTION OF SANDER WHEEL AND PULLEY



AXLE SHAET



CROSS-SECTION OF TABLE

SHOP TRAINING FOR VICTORY

A monthly department devoted to items of interest concerning defense-training classes

The Record to Date—A Summing Up

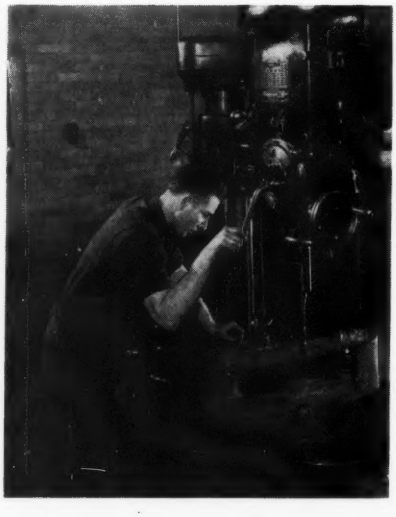
by **N. A. Burnell, 2nd,** ***Director of Defense Training, Federal Security Agency***

VOCATIONAL training in public vocational schools to fit men for occupations essential to the national-defense program was authorized by Congress in June, 1940, and $15,000,000 appropriated to provide the training. The problem facing our national industries in expanding their production to meet the needs of national defense, it was realized, included the need for workers in large numbers with a degree of training for specific operations in specific occupations. Vocational schools, organized and operating in the various states, and supported in part from federal appropriations under the Smith-Hughes Act of 1917 and the George-Deen Act of 1936, were equipped with shops and shop facilities to provide the training. Few of them were in use except during the regular school day, five days a week during the school year. It seemed an easy matter to establish in these schools defense-training programs using their shops in the after-school hours and during the summer vacations. The supposition was found to be correct. In the first 16 months of operation over 1,000,000 men had received training. Before Congress appropriated money for the program and actual training was started in these schools, a comprehensive survey had been carried out throughout the country, and a detailed record of tools, equipment, and space available was made and filed in the United States Office of Education. This survey provided the information on which Congress based its appropriations initiating the national defense-training program.

The needs of defense industries for skilled workers are being met in several ways. As would be expected unemployed men already skilled or semiskilled in applicable types of occupations were first employed. Men already employed were up-graded in the factories where they worked, leaving vacancies in the lower brackets for additional workmen with little or no training to be taken in at the bottom and begin their upward progress. To fit men in part at least for these beginner positions there were organized pre-employment courses and refresher courses. The pre-employment courses were for men never before employed in the type of jobs which they were called upon to carry out. The refresher courses were for men who had in the past been skilled or semiskilled workers, but who had drifted into other occupations and needed to redevelop partly lost skills. Supplementary courses were added at the beginning of the program for men already employed in the defense industries who by training in the vocational schools outside of their regular work hours could be fitted for greater skills or for promotion into more responsible positions.

Public Law 146 approved July 1, 1941, appropriated $52,400,000 to carry on the defense-training program in vocational schools during the fiscal year 1942. The United States Office of Education, through the Commissioner of Education and a Director of Vocational Training for Defense Workers, is in general charge of the program as the federal appropriations are made to that office. In the various states it is carried out through the state vocational education authorities and local vocational schools and school authorities. The money may be expended only in public vocational schools or in institutions exempt from taxation under Section 101 (6) of the Internal Revenue Code. These are institutions not operated for profit.

Student in national-defense class in the machine shop of the E. D. Libbey High School, Toledo, Ohio, where Carl T. Cotter is in charge of national defense training.



In the original defense-training act Congress appropriated $8,000,000 for the rental or purchase of equipment to supplement that already available in the public vocational schools. Public Law 146 made an additional $20,000,000 available for this purpose.

Since the first of July, 1940, there have been enrolled up to November 30, 1941, in the pre-employment and refresher courses a total of 485,000. On that date there were approximately 110,000 in these courses. In the supplementary courses for the up-grading of workers already engaged in defense industries, the cumulative enrolment to November 30, 1941, is 578,000 with a net or current enrolment on that date of 171,000. This makes a total of 1,063,000 persons trained through or in training in this program in the first 17 months of operation.

The occupations in which training is normally to be given are prescribed by the Labor Division of the Office of Production Management which has published a list of some 500 occupations in 14 industries, largely engaged in defense production.

In addition to skilled and semiskilled workers in factories to operate machinery and for other purposes there is a demand in increasing numbers for technical and supervisory engineering personnel. This is being met by what is known as the Engineering, Science, and Management Defense-Training Program carried out through the United States Office of Education, directly in colleges and universities through short-time intensive courses of college grade. An appropriation for this purpose was made in what was called the Engineering Defense-Training Program for the fiscal year 1941. In Public Law 146 referred to above $17,500,000 was appropriated

to continue and broaden the work. The total number of persons reached by the engineering schools to November 30, 1941, was 155,000. The number enrolled on that date was 65,500.

The courses included in this training in colleges and universities are specifically training for chemists, physicists, and production supervisors in fields essential to the national defense.

These two programs, the Vocational Defense-Training Program and the Engineering, Science, and Management Defense-Training Program constitute the principal programs for the specific training in occupations essential to the war industries. There are minor programs for National Youth Administration youth and for Civilian Conservation Corps enrollees. A part of the program for NYA youth is what is known as the Out-of-School Rural and Non-Rural Youth Program. This includes preparatory work for trades and industries which usually needs to be supplemented by further training before the youth are employed in industries. It includes to a greater degree preparation for farm activities to assist in the general program of producing sufficient foods to meet the needs, and to replace farm help drawn into industry or selected for military service. In this there were 37,500 youth enrolled on November 30, 1941, with a total of 224,000 in the 17 months. In defense-training courses for NYA youth 334,000 is the cumulative enrolment.

According to official figures of the U.S. Office of Education 1,776,000 persons received defense training in the 17 months up to November 30, 1941, including training in all programs mentioned above.

Additional training is given to men needed in various services. The Army and Navy have courses for enlisted men for maintenance work on Army and Navy mechanical equipment, together with courses for civilian employees. The Maritime Commission is training ship officers, radio operators, and seamen to man ships operated by that agency. The Civil Aeronautics Administration is conducting a pilot-training program to meet the needs of the armed services. The Labor Department is charged with the promotion of apprenticeship programs in defense industries. The Training-Within-Industry Branch of the Office of Production Management was established to promote training by industries themselves within their plants to upgrade workers of all levels. It is doing an excellent job and its plans are in extensive operation. Work Progress Administration enrollees are assigned to training both in vocational schools, and for in-plant training in industries. While training they receive their regular WPA wages. Those in in-plant training, after a period of from two to four weeks, are transferred to the payrolls of the industry and receive learners wages.

NEWS FROM THE SHOP FRONT

PRIORITIES assistance has been granted for deliveries of steel plate and welding electrodes used in the operation of defense-training classes. Preference Rating Order P-92 has been assigned for the purpose. It has been announced that the program in welding will be expanded. Only 30 percent of the steel plate to be delivered under the order will be "new" plate which plate will only be used for testing the proficiency of students.

A CALL to carry on defense-training classes "around the clock" has been made by Sidney G. Hillman of the OPM who points out that 600 school shops are already on a 24-hour basis and that others of the 11,000 shops participating in the program should follow suit because of the great need for trained workers in war industries.

Announcing . . .

A New *Revised* Edition of the
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LET'S USE *Slides*

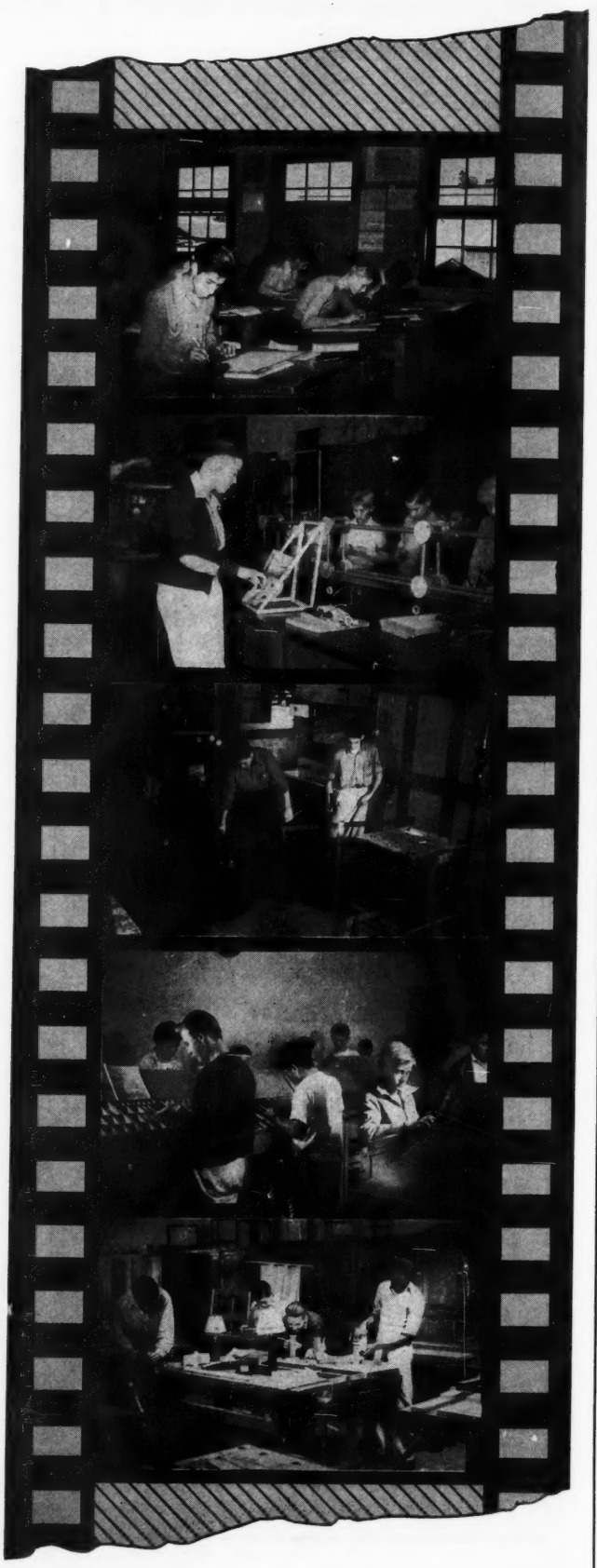
By **Glenn H. Gardiner,** instructor in drafting & visual aids, Dana Junior High School, San Pedro, California

YOUR camera can be your best teaching aid in the field of industrial arts and vocational education. Modern fast films and up-to-date methods of processing make that old Brownie of yours a valuable tool in collecting and presenting visual information. The student will remember what he sees long after he has forgotten what he hears.

There are many ways in which pictures may enhance the industrial education curriculum. By the use of all sorts of visual aids, the shop teacher can enrich his program to a greater or lesser degree depending upon his versatility. Two of the most important visual aids found in schools today are moving pictures and slides. I would like to focus your attention to some of the possibilities in the use of 35-mm. slides. The following are but a few of the methods and procedures which alert shop men are taking advantage of in their classroom work.

1. Slides showing safety rules.
2. Slides showing the correct use of tools.
3. Slides showing correct working posture. Also work habits and class organization.
4. Copying small drawings or illustrations for projection on a large screen so the whole class can readily see them.
5. Test and examination slides.
6. Sequence shots of a project under construction.
7. A permanent record of completed projects.
8. Shots of successful graduates on the job in shops, factories, and in drafting rooms.

You may ask: How can I take these pictures? Simple enough! Any camera will do that has a time-exposure setting. Buy a fast panchromatic film and some inexpensive flash bulbs. The camera should be on a tripod or set on a table or other steady support. Select your subject and focus your lens. Now turn off the lights or pull down the curtains so as to make the room as dark as possible. Next, open the shutter on the camera, set off the flash bulbs, and close the shutter. You have the picture! Most modern photo finishing studios will make a positive 35-mm. black-and-white print from any size negative. After you mount this print in a 2″ by 2″ ready-mount slide, it is ready for projection in the school projector.



A Trip through the Dana Shops (right)

A series of slides recently shown to a local Rotary Club for public relations contacts. A student spoke and answered questions about the activities of the drafting, electrical, metal, printing, and wood shops.

What of the *Future?*

by Earl G. Darby

JUNIOR and senior high-school pupils, living in a college town with no industries, can be given the advantages of personal and vocational guidance.

Individual teachers in the Manhattan, Kansas, Junior-Senior High School have realized the misery caused by a distasteful occupation and have also realized that a serious fault of education is that students are given no real experience in meeting life situations. For several years individual attempts have been made to help pupils to become adjusted to life and to plan the future according to their interests and abilities. While the attempts of the teachers met with considerable success, a growing need was felt for a central guidance agency to coordinate all efforts in the field. For the first time last year an instructor with special guidance training spent two-fifths of each school day as director of guidance. Now guidance is a basic part of the whole school program. Working with the guidance director are the homeroom teachers, the classroom instructors, and the school administrators. Their guidance may be classified as educational, health, vocational, leisure time, and social.

Educational Guidance

1. One of the first things done by the guidance director was to make a survey among the senior high-school pupils. In this way pertinent information was obtained that is available, not only to the director, but to the pupils' homeroom teachers.

2. The director also gives the Otis self-administering test of mental ability to pupils before entering junior high school and the Otis quick-scoring test of mental ability to the ninth, tenth, eleventh, and twelfth grades.

3. Cumulative records are being developed for each pupil. In these records are to be found the survey blanks, the results of each of the above tests expressed as an IQ, and specimens of regular classroom work. In the future these records will be started when the child enters kindergarten. Such a record presents a true picture of each pupil's development. It shows how certain of his tendencies change or die out while others grow stronger from year to year. This brings his needs to attention more readily and effectively than any study of the boy or girl at any single stage of life development.

4. Personal interviews are granted the pupils. In one year the guidance director had 350 interviews with individuals or small groups. The pupils freely asked advice concerning their health, their study habits, their choice of schedule, their preparation for college, and their choice of a life vocation.

5. Homeroom programs are planned to include several on the subject of vocations.

Health Guidance

Health plays a vital part in the success or failure of an individual. Regardless of how well adjusted he is vocationally, he will never enjoy the highest success or prosperity if he has neglected his health. Many different agencies contribute toward the good health and personal hygiene habits of the pupils. The whole program is under the supervision of the health director and of the school nurse.

Shop teachers have no small part in the functioning of a really effective guidance program. Here is a description of a working program from kindergarten through high school which is touched at many points by industrial education—a correlation which adds effectiveness to any shop program. Earl G. Darby teaches shop practice at Kansas State College and formerly was a member of the public school staff of Manhattan, Kansas.

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1. A preschool physical examination is given each pupil the spring before he enters kindergarten. A follow-up examination is then given in the fall after school begins.

2. Health instruction through grade school and in high school is given by the individual teachers.

3. An annual physical examination is given each junior and senior high-school pupil. Cooperating in this are the physical education instructors, the school nurse, and local physicians.

4. A full-time school nurse performs the regular duties of her office.

5. Annual dental examinations are given by local dentists and the school nurse. The homeroom teachers follow up by urging that the necessary work be done and reporting such work as is completed.

6. Annual eye examinations are given all junior and senior high-school pupils by the physical-education instructors. Such examinations bring to light cases of poor eyesight in students who may have been considered cases of low mentality and also disclose defects that can be remedied before they become extremely severe or chronic.

7. Annual ear examinations are given by the use of a Western Electric Audiometer. Many pupils considered dull are found to be hard of hearing instead. When handicapped individuals have their seats in the classroom arranged so they can see and hear, they not only improve their grades but they also become better adjusted socially.

8. Free immunization and vaccination are given periodically by local physicians.

9. Personal interviews in reference to health are granted by the guidance and health directors.

10. At the directors' recommendation, interviews with the school nurse are arranged.

11. Regular physical education work is required of all pupils.

Vocational Guidance

1. Many personal and vocational problems are solved by the sympathetic classroom teacher. This is especially true of the teacher of vocational courses. It is not always a fact that the problem boy or girl in an academic course is also a problem boy or girl in a shop course. Realizing this, the administration frequently refers problem pupils to the vocational teachers. After the pupil gets away from the formal atmosphere and is encouraged to let his hands carry out the ideas of his mind, he finds himself in a way not possible in the academic course. The program of shop courses is flexible to take care of a variety of needs.

2. Some of the homeroom programs are designed to aid the pupils in making a choice of a vocation.

3. Material on vocational subjects is being assembled in the library.

4. A vocational survey is made and an outline of vocational interests is worked out by the pupils.

5. For several years specialists in their own field have given talks to seniors interested in their vocation. Before each talk, pupils make an outline of information wanted. Much interest is manifest. Last year these talks were increased in number and scope to include all senior high-school pupils.

6. Vocational agriculture is taught according to state requirements. These boys receive training both in shop and recitation and also work on year-round projects at home on the farm.

7. All ninth-grade pupils may elect

a vocational class called "Occupations." This class meets daily for a semester. The course is planned to create an interest in exploring the field and to fill a definite need of the members of the class. They study each occupation from the following angles: its nature and history, qualifications and training needed, schools offering such training, social conditions involved, working conditions, remuneration, advantages and disadvantages, and ethical standards. Information is gained through personal interviews, through the study of books, and through observation. In class, the various findings are compiled and discussed.

The vocation in which the student is most interested is then studied intensively. These findings are submitted in the form of a written report at the close of the course as a term paper.

The class takes a number of trips to points of vocational interest, not only in the local community, but also to industrial centers in the state. These trips are not taken merely because the teacher and pupils want an outing. Each trip and each point of interest is planned. The pupils know what they are to look for before they start. After they return, the different points of interest are discussed in their class work.

8. Realizing that an opportunity for practical experience is the phase that needs most attention, the occupations teacher arranged for the pupils to work in retail establishments and shops in the city. There were two reasons for planning this experiment. First, the instructor wanted to give the student actual practical experience in the world of work and in getting along with people; and second, he wanted to provide means for the student to find himself and see if he were interested in certain types of work. Twenty-three business firms took from one to three students and gave them this training and experience. Before starting to work, the students discussed in class what kind of a job they wanted, what the employer would expect of them, and what they could expect of their employer. The instructor took great care that each member of the class had a thorough understanding of what was expected of him.

Each pupil was required to keep a daily diary which was turned in to the teacher every morning. He checked these and helped with any problem which presented itself. He also held a group conference once a week. At the close of the experiment the diaries were returned to the pupil for a complete report of his work.

From the viewpoint of the student, his parents, the school and the business men, the experiment was successful enough so that it was repeated the second semester. During the year 53 students spent two and one-half hours each school day for a two-week period as an actual worker in a business establishment. In many cases they worked on Saturday, some being hired as extra help and others doing the work voluntarily. Several were given regular employment during the summer months. Needless to say, both boys and girls are very enthusiastic about the course.

9. In the senior high school in the field of home economics, about 18 girls are taking cafeteria work. They spend about three and one-half hours a day in preparing and serving meals in the high-school cafeteria. For the past several years, the cafeteria students have worked three and one-half hours a day for six weeks in homes and business places in the community, thus receiving practical experience which they could not have obtained at school. This has also led to the obtaining of regular employment.

10. Likewise, members of the advanced stenography class spent a period of three and one-half weeks, two and one-half hours a day, working in offices of business institutions. In this work they receive definite training in office procedure. In some cases they have been immediately employed.

11. Last year two senior boys from the industrial arts department were given part-time apprenticeship training in local garages. As a result of this training, one boy is employed part time and the other regularly by these firms. Another boy was given carpentry apprenticeship training by a local contractor and is now working at the carpentry trade.

It is felt by all concerned that the results of this apprenticeship training have been very much worthwhile. These boys and girls, in the ninth-grade occupations class and in the senior high-school vocational classes, have become better citizens. They have become more considerate of sales people and more appreciative of their parents. They have learned that it takes effort to make a living, that there is a need for the academic subjects. They appreciate good health and have learned to be courteous even though they do not feel like it. All of this develops character and personality. What greater service could the school render an individual? Also the school and the community are brought closer together. Other teachers notice a difference in classroom attitude. The whole system is benefited.

Leisure-Time Guidance

Another important service that the school can render the individual is teaching him what to do when he has nothing to do. This need is increasingly important with working hours shorter than ever before in many fields. An interesting hobby or leisure-time activity helps develop character and personality. This service is being rendered in three definite ways:

1. The guidance director grants personal interviews with all pupils desiring them.

2. The homeroom programs include hobby talks and discussions by pupils and outside talent and hobby exhibits by the pupils.

3. Interest clubs help develop interest in many worthwhile activities. There are a sufficient number of clubs to accommodate every individual in senior high school. Actually about 55 percent of the students belong to an interest club. These clubs include art, dramatics, music, photography, science, aviation, etiquette, commercial, future farmers, and athletics. Besides these clubs, any boy in school is privileged to work in the shops an hour after school two days a week.

Social Guidance

The administration and the guidance director attempt to provide a well-rounded social program as a part of the school extracurricular activity. Many school organizations cooperate in providing these activities. The pupils receive training in leadership and the ability to get along with people while working on the committees that plan the events. Then they gain experience in the social graces while the event is in progress.

1. Each homeroom teacher and the homeroom mother cooperate with the student committee in giving a homeroom picnic or party.

2. A student committee from each class with the aid of its faculty adviser plans one or two class parties a year. During the three years in senior high school, these parties furnish the pupil experience in informal and several types of formal parties.

3. Other student organizations, such as the Girl Reserves and the Hi-Y, have annual parties and banquets, some of which are to entertain their fathers and mothers. These affairs result in a closer feeling between the school and the parents and often between the individual boy or girl and his or her own parent.

Such is the personal and vocational guidance program of the Manhattan Junior and Senior High Schools.

Lathe Centering Device

by **CLIFFORD L. YARD**

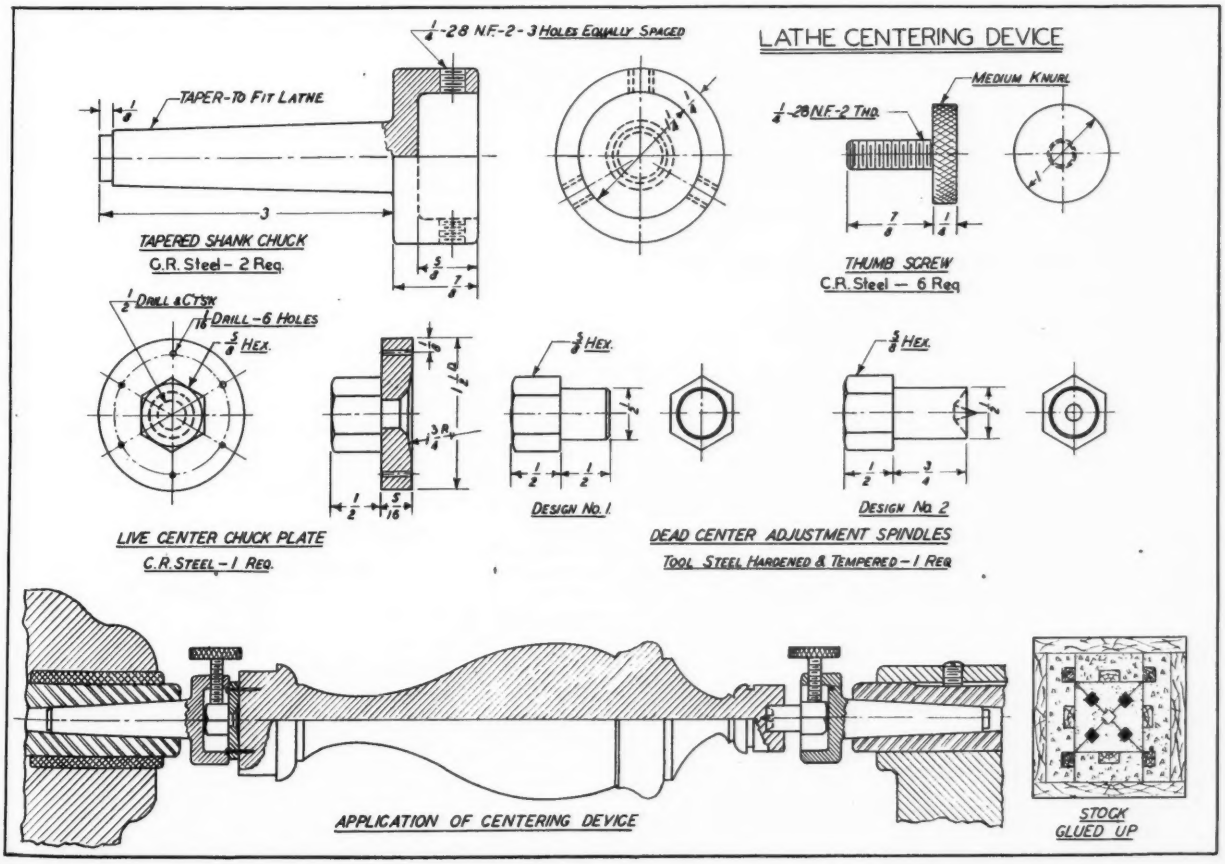
Here is a very ingenious device which would be handy in any woodworking shop. It can be used as a teaching project in machine shop. Clifford L. Yard teaches Industrial Arts in the Hastings High School, Hastings-on-Hudson, New York

PROJECTS which are built up of different kinds of wood to enhance their design frequently are somewhat of a disappointment because when the turning is finished the design is out of center. This trouble can easily be rectified by the use of a centering device such as the one presented herewith. The working drawing shows one made of metal which is superior to one made of wood but if no machine shop is available a satisfactory one may be made in a similar manner from maple or any other hard close-grained wood.

As the drawings are selfexplanatory the construction of the centering device will not be elaborated upon. The project is first turned nearly to finished dimensions and then mounted on the centering device for the final turning process. It is centered as well as can be done from observation, then the project is rotated and a pencil is held against various sections to determine how much it is out of center. Adjustment is made by loosening two thumb screws and tightening the third thus moving the work toward the two thumb screws just loosened. The project is then turned with a very light cut and readjusted until the design appears exactly the same on all sides.

Incidentally, such built-up projects can be made more attractive if the laminating strips are so placed as to have the design appear at the points where they will be most effective. This can be accomplished if a pattern is cut out full size and traced on a sheet of paper and then the design planned in terms of an end view. The position of the strips is located by projecting from the elevation to the end view, placing them where the contour of the project varies most abruptly.

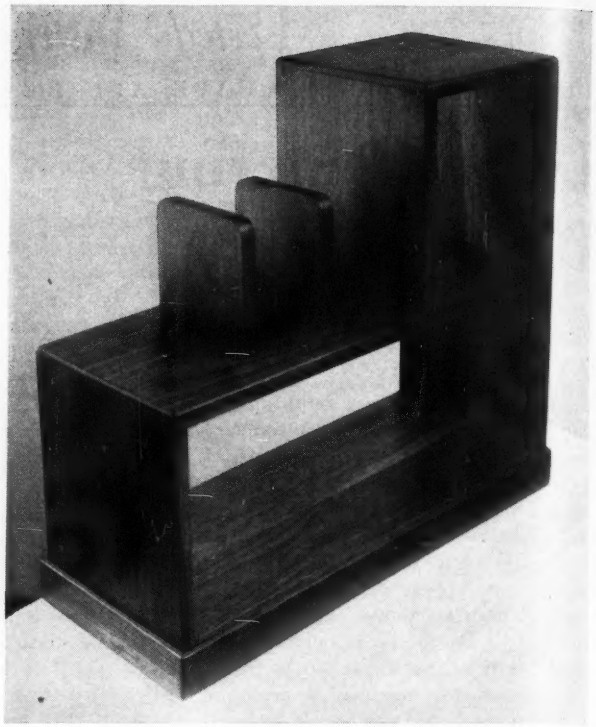
● Samuel Gompers Trade School, San Francisco, has the distinction of being the first, and at present, the only school to operate a frequency-modulation station. The station has its studio, control room, shop, and offices in the school building and telephone lines connect it with remote studios in six other city schools. In addition to broadcasting educational programs to the San Francisco school system, the station serves as a training school for radio men.—*Education by Radio.*



Modernistic Table

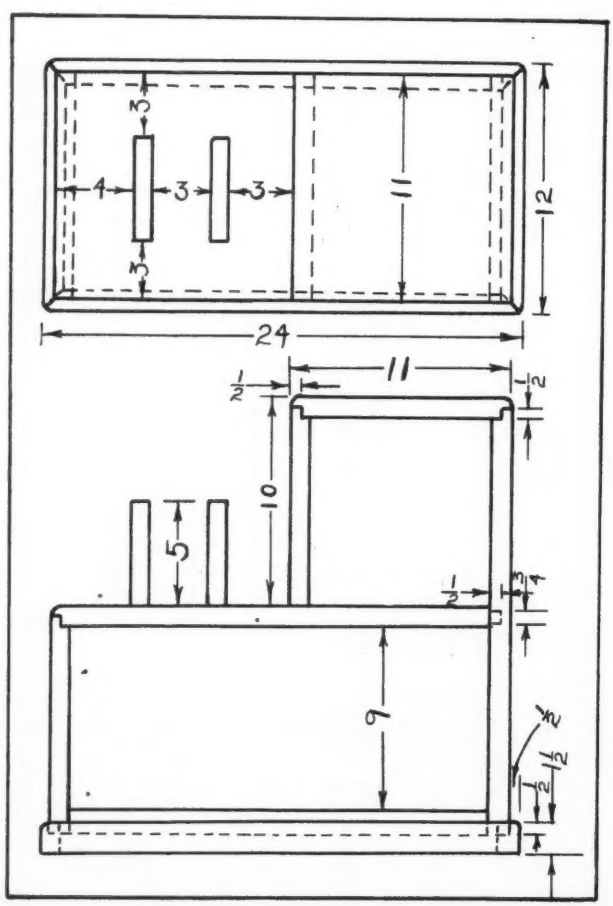
• *by* R. J. COLTHARP

This modern versatile table is valuable for teaching because of the manipulative work called for in making the wide variety of joints. R. J. Coltharp is Assistant Professor of Industrial Arts, Georgia Teachers College, Collegeboro, Georgia.



THIS modernistic table possesses several features which make it valuable as a project for woodworking classes: although of the modernistic style, it harmonizes well with most living-room furniture; it can be used as a book holder, magazine rack, table for a small radio, or smoking stand; and the variety of joints used in the construction of the table increases its manipulative values. Any well-figured cabinet wood is satisfactory; the table pictured here was made of walnut, stained, filled, and varnished, after which it was carefully rubbed down. All stock should be a full inch in thickness after being planed, or it will be necessary to make slight changes in several dimensions. It will be necessary to make several trial assemblies before all parts fit satisfactorily. Also, all pieces should be well scraped and sandpapered before making the final assembly.

As shown in the drawing, miter joints are used in assembling the base; a one-half inch rabbet is cut on the upper inside arris of each piece of the base; the bottom of the table sets in this rabbet, and is both glued and fastened with corner irons to the base; corner irons are used at the corners of the base. End rabbet joints are used in assembling the ends of the bottom and the lower ends of the end pieces; end rabbet joints are also used in assembling the top and the end pieces, as well as the left end of the middle shelf and the left end of the table. The bottom may be glued and fastened with screws to the ends; small corner brackets, or desk-top clips may be used in assembling the other rabbeted joints, which are well glued. The right end of the middle shelf is joined to the right end of the table with a blind mortise and tenon joint, carefully glued. The 5″ x 5″ holders, as well as the upright from near the center of the middle shelf, are fastened to the middle shelf with a butt joint and flat-head screws, which are countersunk.



After all parts have been carefully fitted they should be glued, fastened with screws, and clamped firmly together. Because of the time required for making this final assembly, hot glue is not recommended. All surplus glue must be carefully wiped off.

As illustrated, all upper and outside arrises on the main part of the table are slightly rounded. The finish used on the table depends on the kind of wood used, as well as the individual inclination of the student and facilities available.

BILL OF MATERIALS:

1—top, 1 x 11 x 11.
1—middle shelf, 1 x 11 x 22½.
1—bottom, 1 x 11 x 22.
1—right end, 1 x 11 x 21.
1—left end, 1 x 11 x 10.
1—center upright, 1 x 11 x 10½.
2—holders, 1 x 5 x 5.
2—bases, 1 x 1½ x 12.
2—bases, 1 x 1½ x 24.
9—corner brackets, 1½ x 1½, or desk-top clips, with ¾″ flat-head screws, for top and middle shelf.
7—No. 10, 2½″ flat-head screws, for middle upright and holders.
6—No. 9, 1½″ flat-head screws, for fastening bottom to ends.
12—corner irons, 1″ x 1″, with ¾″ flat-head screws for fastening base pieces together and to the bottom.

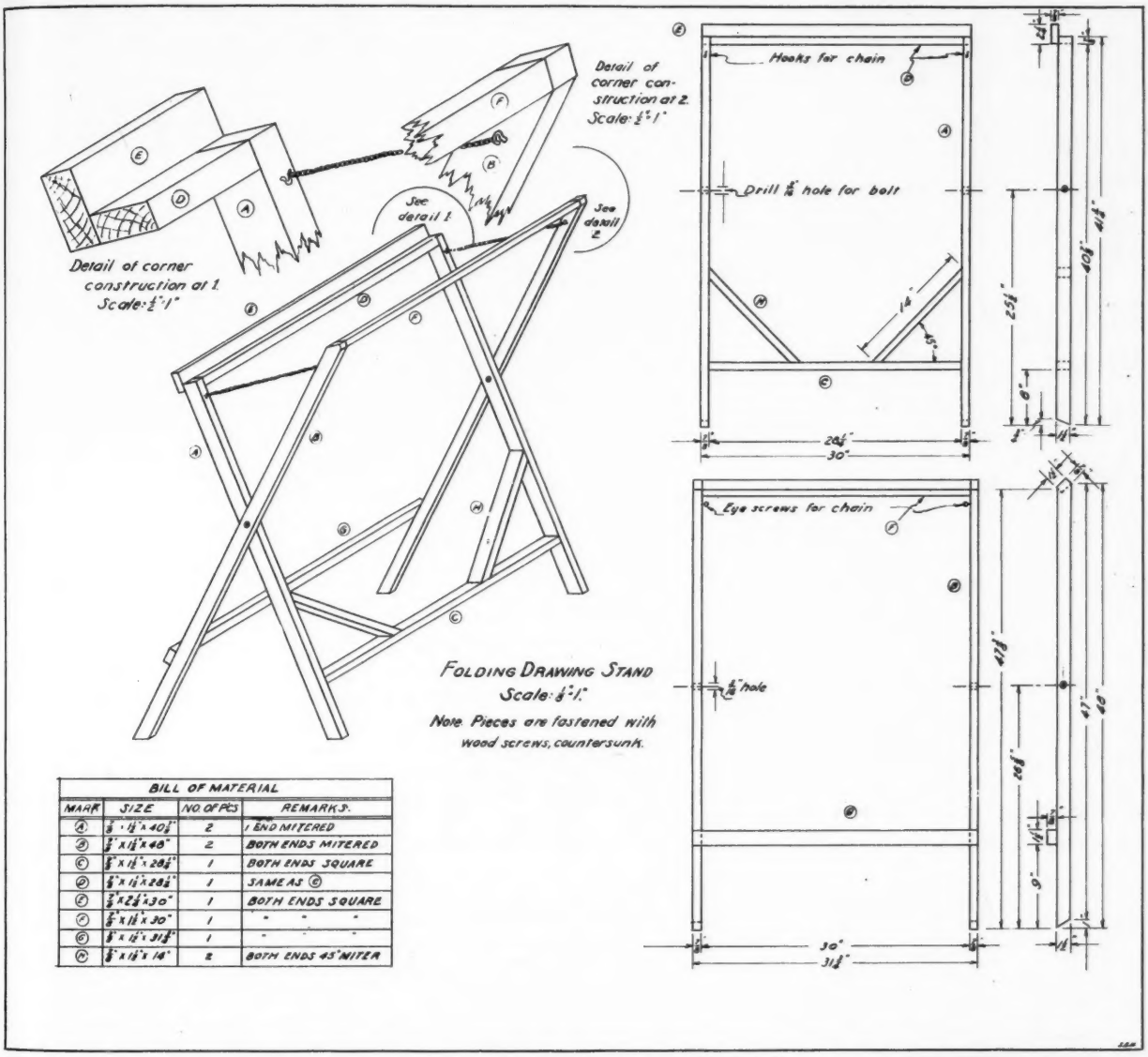
Folding Drawing Stand

by **ISADORE M. FENN**
Chicago Vocational School

HERE is a practical job for the ninth-grade student: to make a blueprint, learn how to read it, construct from the directions, and finally, realize the pleasure of using the drawing stand in his home.

The project correlates mechanical drawing with shopwork, and at the same time motivates the student to construct something useful to him.

The stand requires 15 to 20 double periods of 80 minutes for construction. With use of scrap material, the project can be built at low cost. Long pieces may be ripped on the circular saw.



FOLDING DRAWING STAND
Scale: 1" = 1"

Note. Pieces are fastened with wood screws, countersunk.

BILL OF MATERIAL

MARK	SIZE	NO. OF PCS	REMARKS
A	⅞" x 1½" x 40½"	2	1 END MITERED
B	⅞" x 1½" x 46"	2	BOTH ENDS MITERED
C	⅞" x 1½" x 28½"	1	BOTH ENDS SQUARE
D	⅞" x 1½" x 28½"	1	SAME AS C
E	⅞" x 2¼" x 30"	1	BOTH ENDS SQUARE
F	⅞" x 1½" x 30"	1	" " "
G	⅞" x 1½" x 31½"	1	" " "
H	⅞" x 1½" x 14"	2	BOTH ENDS 45° MITER

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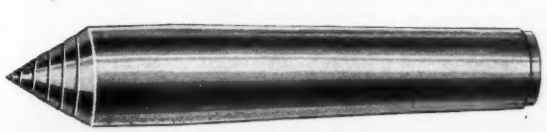
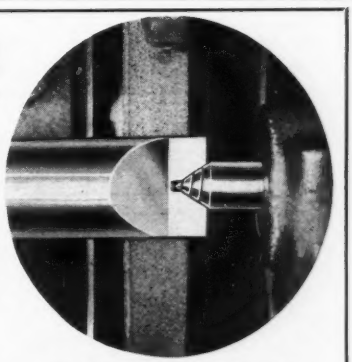
when used with CMD Center-point Lubricants has an operating ratio of from 15 to 1 running time over the conventional lathe center.

CMD Helical Groove Center expels heat from the work caused by cutting tools—conveys center lubricant to extreme point of work and center—lubricates entire bearing surface of work and center. No stopping of lathe to relubricate center. No readjustment of tailstock necessary. No dripping or crushing out lubricant. Frictional heats reduced. Expansion of work kept at minimum.





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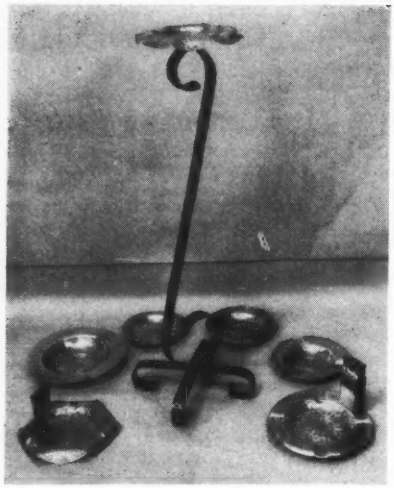


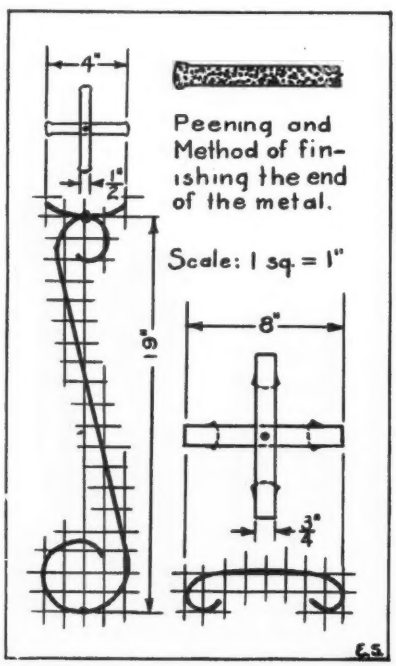
Strap Metal Smoking Stand

• *by* EINAR E. SIRO

This is an excellent project for coordinating strap metal and art metal work as it involves operations common to both fields. Einar E. Siro teaches shopwork at the Folwell School, Minneapolis, Minnesota.

A GREAT deal of originality may be brought into play by the student in designing a strap metal smoking stand. The project is interesting and practical. It is hoped that the simplicity of design and construction of the stand shown in Figure 1 will prompt the student to design, make, and finish his own stand in his own individual manner.

The following is a description of the material and operations involved in making the smoking stand in Figure 1. Mark off a sheet of paper approximately a foot wide and two feet long into one-inch squares. Make a full-size drawing of the stand on the paper using the detailed sketch in Figure 2 for a guide.



Material required for making this stand is strap metal: leg, 1 pc. ¼" x ¾" x 31"; base, 2 pcs. ¼" x ¾" x 13"; tray holder, 2 pcs. ⅛" x ½" x 4"; and two rivets for assembling.

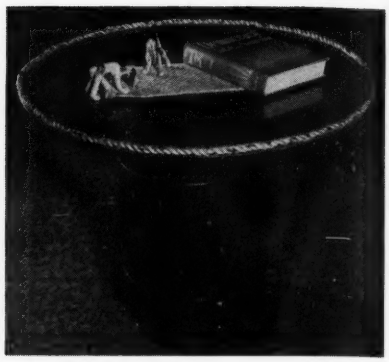
Hammer mark the metal on all surfaces using the round end of a machinist's ball-peen hammer. Use a heavy metal surface to work on and a sheet of lead between the work and the metal to protect the finished surfaces. Shape the ends of the metal straps (refer to Figure 2) and clean the surfaces with sandpaper, emery cloth, or steel wool. Form the pieces over a piece of pipe, stake, horn of an anvil, or on a special bending jig. Check the curves of the parts by laying them on the full-size drawing. Mark and drill holes for the rivets, and assemble.

Prepare the stand for finishing by removing all oil and dirt from the surfaces. Finish with black enamel or lacquer. After this has dried thoroughly rub lightly with sandpaper or emery cloth so that the raised portions become bright and the low portions remain black. Apply a protective coating of shellac or varnish. Transparent lacquer may be used if the undercoat was lacquer.

The ash tray may be of either glass or metal. The metal tray may be purchased or made as a project by the student. In Figure 1 are shown a number of suggested types of copper trays. A great variety of trays can be made out of black or galvanized iron.

Craftsman Offers Woodworking Manual

If you want a complete handbook on finishing fine woods, we refer you to *Practical Furniture Finishing* by A. B. Pattou. It tells how to create and repair finishes for the more popular woods as well as the technique of finishing fancy veneers, inlays, etc., and novelty finishes. Explains the brushes as well as materials to be used and goes into detail on colors and color schemes. Over 100 illustrations including 4 pages of foreign and domestic woods illustrated in natural color. 112 pages, bound in cloth. $1.25, postpaid, from Craftsman Wood Service Co., 2731 S. Mary St., Chicago, Ill. *Complete catalog* of rare and domestic woods, hard-to-get tools and hardware, including many wood-work projects, tips, fully illustrated also available from same source for 10c, refundable with first order.



Nail Keg to Lawn Table

• *by* DELMAR W. OLSON

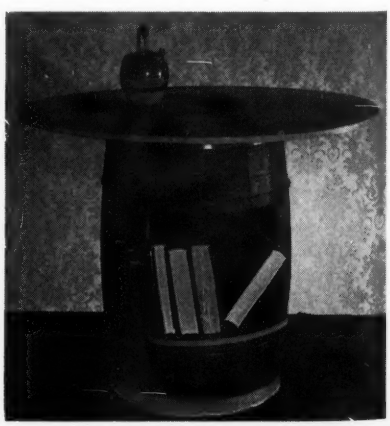
Southern Illinois Normal University, Carbondale

AN old nail keg can easily be made into a novel occasional table in no more than a couple of hours. This project is illustrative of resourcefulness—a quality which is becoming significant as materials become hard to obtain.

Because of their simplicity and novelty these tables have more attractiveness than would seem possible in a lowly nail keg. Accompanying illustrations show two possibilities. With a good waterproof finish such tables would be just the thing for lawn or porch furniture.

Construction is simple. A piece of ⅜" fir plywood, 24 inches in diameter, is fastened to a keg as shown and the whole thing is sanded and finished to suit. A shelf can be added, as shown, by cutting out an opening in the side of the keg and nailing in a circular piece of plywood. Note the protruding lip on the shelf shown.

Manila rope ⅜" in diameter was tacked around the top edge of one table. The tables shown were stained and lacquered.



WHAT'S DOING IN THE FIELD

news

OF INDUSTRIAL EDUCATION

U. S. OFFICE OF EDUCATION announces that trade and industrial education classes enrolled 758,509 students for the year 1939-40, compared with 715,239, for the year 1938-39. Auto mechanics, electricity, machine-shop, general vocational, metal-working, aviation, building-trade, drafting, and carpentry courses, in the order listed, attracted the heaviest enrolments.

ARTHUR KAYS, manual training teacher at W. K. Kellogg School, Nashville, Mich., has devised a plan whereby each of the 15 teachers of the school will purchase a Defense Bond during the next few months. Each week each teacher contributes $1.17, and each week a name is drawn from a hat. The person whose name is drawn then receives an $18.75 Defense Bond. By the end of a 16-week period, each teacher will possess a Bond.

DECEMBER 3, 1941, saw the dedication ceremonies for the new Unit E addition to Fordson High School, Dearborn, Mich. Open house was held for hundreds of visitors who inspected the $75,000 addition which houses enlarged industrial shop facilities and defense classes.

JOHN M. HURLEY, former Boston professional football player and now New York City shop teacher, addressed the February meeting of the Brooklyn Guild, Teachers of Shopwork of New York. Hurley spoke on and demonstrated the art of sculpturing in soap.

VERNE C. FRYKLUND, University of Minnesota, Minneapolis, is editor of a chapter on "Industrial Education" in the latest *Review of Educational Research*. This is the first survey of industrial education research printed by the *Review*, which reviews research in various educational fields at three-year intervals.

DOUGLAS C. MACKEACHIE, Director of the Division of Purchases of WPB, announced January 24 the addition of a schools section to the governmental requirements branch and the appointment of George Frank, purchasing agent of Cornell University, as chief of that section.

Applications of schools and colleges, public and private, for priority assistance in obtaining critical materials, such as typewriters, machine shop tools and equipment, and steel and copper for new buildings and additions, will be handled by Mr. Frank.

STUDENTS at Gompers Vocational High School, New York City, are bundling up old newspapers, magazines, and test papers—1,000 pounds weekly—and selling them to local waste-paper dealers, as part of their contribution to the National Defense Program. In addition to conserving paper, this activity brings additional income to the Student Welfare Fund. Dental fees for students unable to pay for needed treatment will come from this fund.

Gompers English classes have established contact with a British vocational school for the purpose of exchanging correspondence with the English group.

A CONSTITUTION for the Southeastern Minnesota Industrial Arts Association was adopted at a dinner meeting of the organization November 26, 1941, at Hotel Martin, Rochester.

Decision was made to affiliate with the Minnesota Vocational Association and the American Vocational Association.

BUILD *Gliders* IN YOUR SHOP

✦ ***For Defense***

Train workers for our aircraft factories, supply gliders for training future pilots.

✦ ***For Sport***

Gliding and Soaring provide the finest sport aviation has to offer, ideal for youngsters.

✦ ***To Maintain Student Interest***

No project has greater appeal to youth than building gliders for school clubs.

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Glider training is the safest, surest, and cheapest way to insure an adequate supply of pilots and builders for military and commercial planes of the future.

Building a glider wing

"Youth Must Fly"

BY COMMANDER E. F. McDONALD, JR.

THE fascinating story of gliding and soaring, a sport which can win the war for America. Describes technic of gliding and soaring, tells how gliding bridges the gap between model building and power flight, how it makes better, safer pilots, why it is an ideal sport for youth and the perfect project for high school and college shops. Discusses glider as a military weapon, tells how Germans used glider training to build a great airforce with unprecedented speed, how U. S. Navy experiments proved value of gliders in selecting pilot material.

The author is a great business leader who credits the growth of his own industry to the creative ability and eager enthusiasm of American youth, and urges that aviation profit from the same talents through universal glider training.

Contains latest information on Federal regulations about glider construction, describes glider club organization and financing, discusses problems of home and school construction. BLAZE THE TRAIL TO VICTORY BY STARTING A GLIDER PROJECT IN YOUR SHOP—Order YOUR copy of YOUTH MUST FLY Today! A large book of 253 pages, with over 50 illustrations. Price only $2.50.

TABLE OF CONTENTS

I. ONLY MAN AND THE SOARING BIRDS
II. YOUTH MUST FLY!
III. SAILBOATS IN THE SKY
IV. WHAT YOUTH CAN DO
V. GLIDERS FOR DEFENSE
VI. MORE ABOUT DEFENSE
VII. THE GLIDER AS A MILITARY WEAPON
VIII. GLIDER DESIGN AND CONSTRUCTION
IX. GLIDING BEFORE THE WRIGHTS
X. THE GLIDERS LEARN TO SOAR
XI. WHERE DO WE GO FROM HERE?

APPENDICES

I. LICENSES AND FEDERAL REGULATIONS
II. GLIDING AND SOARING ORGANIZATIONS
III. SCHOOL AND CLUB OPERATION
IV. EXCERPTS—SUTPHIN COMMITTEE HEARINGS
V. CERTIFICATED GLIDERS MANUFACTURED IN U. S. A.

KROCH'S BOOKSTORES, Inc.,
206 N. Michigan Ave., Chicago, Ill.

Please send me, for 5 days' examination, a copy of YOUTH MUST FLY. Upon arrival, I will deposit $2.50, plus a few cents postage and handling charges, with the postman. If I do not wish to keep the book I will return it at the end of 5 days and receive from you my deposit. If I keep the books beyond the 5 day period my deposit will be considered payment in full.

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☐ Check here if you prefer to enclose remittance with this coupon. In that case WE will pay all postage charges. The same 5-day return-for-refund privilege applies.

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Next meeting of the group will be in the spring at Winona.

Officers are L. W. GERECKE, Winona, president; R. H. NORDBY, Rochester, vice-chairman; and ARTHUR PALIVER, St. Charles, secretary-treasurer. Committee chairmen are ARTHUR OLSON, Lanesboro, membership; HARRY JACKSON, Winona, program; E. C. MORGENSON, Rochester, publicity; and THOMAS RICHARDS, Winona, publications.

DETROIT'S Book-Cadillac Hotel will be the meeting place for members of the Michigan Industrial Education Society when they meet in the automobile city April 9 to 11.

THE Industrial Education Department of Oregon State College reports growth of more than 400 percent in its summer session enrolment since the inception of the program in 1928. 'In that year the summer session enrolled 42 persons; in 1940, the registration showed a total of 165 majors and 11 minors.

THE printing department of C. K. McClatchey Senior High School, Sacramento, Calif., has issued the third of its annual book projects, *Narrative of Guillermo Fitch and Blas Pina.* The printing department, taught by GEORGE T. SMISOR, works in cooperation with the language and English classes and the art department, who translate, edit, and prepare the art work for the publications.

THE 1942 convention of the Western Arts Association will meet at Kansas City, Mo., April 8 to 11, in the Municipal Auditorium. Theme this year will be "Art in the America of Tomorrow." Headquarters hotels are the Muelbach and Philips. JOSEPH K. BOTZ, Franklin, Mich., is secretary of the organization.

A MEETING of the Executive Council of the New Jersey Vocational and Arts Association was held at Asbury Park, N. J. late in January to make final plans for the annual convention to be held March 19, 20, 21.

CLEARFIELD School District, Penna., opened the 1941-42 school year with a new vocational building housing defense classes as well as the regular industrial program. The building, formerly occupied by the State Highway Department, makes available 30,000 feet of floor space; plans are to be submitted later for building of adjoining classrooms.

THE new vocational building of York, Penna., schools, known as the Atreus Wanner Vocational School, was formally dedicated last fall. The building, of factory type one-story construction, will accommodate machine shop, welding, heat treating, and ordnance inspection classes.

A federal grant of $110,000 has been made for the purchase of equipment for the school, which will operate 24 hours a day in training workers for defense industries.

DR. GEORGE E. MYERS, retiring professor of vocational education at the University of Michigan and head of the department, was honored at a luncheon held in connection with the Annual Guidance Conference sponsored by the University on January 24. At Dr. Myers, request, a formal dinner in his honor was not given. Speaker at the luncheon was Professor Arthur B. Mays of the University of Illinois, who spoke on "Development of Industrial Arts, Vocational Guidance, and Vocational Education."

SAN ANGELO, Texas, Junior College is planning a new vocational science building. To be ready for operation in the fall, the new structure will accommodate 400 to 500 students.

Wanted—Manuscripts

School Shop is seeking short, practical articles on shop subjects. Payment will be made on publication for material used. Articles are wanted in the following subjects:

Woodworking	***Electrical shop***	***Mechanical drawing***
Metalworking	***Handicrafts***	***Auto mechanics***
Machine shop	***Ceramics***	***Aeronautics***
Graphic arts	***Textiles***	***Etc.***

Descriptions of courses of study and curriculum changes are also desired as well as short items of a paragraph or two describing helpful practices in the school shop.

When preparing manuscripts, please keep the following points in mind:

1. The manuscript submitted should not have been published elsewhere.
2. Manuscripts should be typewritten and double spaced.
3. Title of the manuscript should be followed by the name and teaching position of the author, including the name of the school.
4. Illustrations will greatly enhance the value of manuscripts. Provide, if possible, large glossy photographs.
5. Line and working drawings and detail layouts should be as complete as possible, with lettering in black ink.
6. Drawings, illustrations, and photographs should include name of author and self-explanatory titles or legends.
7. Descriptions of projects should include complete list of materials, average time for completion of the project, and a few words on the educational value of the project.

Manuscripts should be addressed as follows:

THE EDITOR

SCHOOL SHOP

P. O. BOX 100, ANN ARBOR, MICHIGAN

IN THE Morning Mail ...

Brief comments about SCHOOL SHOP *and the field it serves are invited. Address the Editor,* SCHOOL SHOP, *Ann Arbor, Michigan.*

Gentlemen:

A new publication such as SCHOOL SHOP cannot fail to be of value to our rapidly expanding national program of vocational education. However, it seems to me, after seeing your prospectus, that you are missing an unique opportunity to make this contribution complete by breaking new ground. I refer to the fact that industrial training is no longer purely a male prerogative. Thousands of young women all over the nation are now being fitted for employment in scores of highly skilled occupations. A rapidly growing corps of teachers and administrators is vitally interested in this phase of education. Yet for all this lusty growth there is, as far as I know, no publication that even as much as mentions the existence of this phenomena.

Here in New York City for example, there are ten well equipped schools, some newly erected, that are devoted entirely or in part to the vocational training of about 20,000 young women. Their scope is wide and varied, from needle trades to cosmetology, from cafeteria management to dress designing, etc.

Considering all this, I would suggest that SCHOOL SHOP devote some of its space to those shop teachers who are concerned with the vocational training of our girls. I am sure a survey of the country would reveal a wealth of material of interest to everybody connected with vocational education.

BENJAMIN J. STERN
New York Vocational High School
New York, N.Y.

[SCHOOL SHOP advocates industrial education for women and tries to supports its belief with articles. Of course, home economics magazines have long existed for the training of girls in the food, homemaking, and beautifying arts which are so exclusively theirs.—*Ed.*]

Gentlemen:

I would like to submit a suggestion which might be of use to you and your associates. For years a number of research projects have been carried on of definite benefit to industry.

These research problems have been published in various trade and professional journals and have usually been couched in the language used by the research man. Many of the research problems bring out findings of benefit to the teacher of shop both in industrial arts and vocational industrial education.

Would it be possible to have someone familiar with the research publications prepare a series of abstracts setting forth the findings of these industrial research projects and word them especially for the industrial arts and trades teacher? I am sure much can be gained by informing teachers of the many progresses made in the industrial field.

DENNIS H. PRICE
Itinerant Teacher Trainer
Trades and Industry
Indiana State Teachers College
Terre Haute, Indiana

[SCHOOL SHOP awaits word from its readers as to whether they would profit from news of industrial laboratory research and the new developments resulting therefrom.—*Ed.*]

Gentlemen:

We have been receiving SCHOOL SHOP and like it very much. It is a live, timely magazine. Our personnel has changed to some extent, so I am sending you a list of our present teachers to help you bring your mailing list up to date.

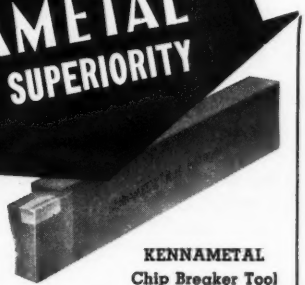
ALBERT CARDOT
Director, Industrial Education
Springfield, Mo., High School

[Thanks very much to Director CARDOT and the hundreds of other directors and supervisors who have submitted lists of their teachers. Won't others do likewise, so their teachers can receive SCHOOL SHOP regularly?—*Ed.*]

Gentlemen:

For some time I have been receiving SCHOOL SHOP and have enjoyed reading it. I wish first to express my thanks for the magazine and

KENNAMETAL
POINTS OF SUPERIORITY



KENNAMETAL Chip Breaker Tool

1 HARDER. KENNAMETAL is harder than the hardest tool steel . . . requires less "down time" for regrinding tools . . . cuts at much higher speeds.

2 STRONGER. KENNAMETAL is stronger than other tool carbides of the same hardness range . . . takes interrupted (jump) cuts without breakage.

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KENNAMETAL carbide-tipped tools will machine steel heat-treated to 550 Brinell while combining roughing and finishing in one operation. Write today for free catalog; also Bulletin 740 which contains complete information on KENNAMETAL.

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with ARMSTRONG TOOL HOLDERS—used in over 96% of the Machine Shops and Tool Rooms. A complete system of Tool Holders comprising over 250 sizes and shapes. Develop "tool sense" and a love for fine tools with ARMSTRONG Drop Forged WRENCHES—Carbon and Chrome-Vanadium Steel Open End Wrenches; Box Socket and Detachable Socket Wrenches with improved designs, better balance, finer machining and finish. Set up jobs with modern, safe, ARMSTRONG Drop Forged Setting-Up Tools. Use ARMSTRONG Drop Forged Clamps that never slip, spring or spread, and ARMSTRONG Drop Forged Lathe Dogs that are standard everywhere.

Write for Cutter Grinding Charts and new C-39 Catalog. Sent to Instructors upon request.

ARMSTRONG BROS. TOOL CO.
"The Tool Holder People"
312 N. Francisco Ave., Chicago, U.S.A.
Eastern Warehouse & Sales Office: 199 Lafayette St., N.Y.

second to compliment the staff of SCHOOL SHOP for filling the gap left when *Industrial Education* ceased publication. However, you are also filling another gap: you are causing a better understanding of the fields of industrial arts and trade and industrial education.

GEORGE F. HENRY
Head, Industrial Art Education
Colorado State College
Fort Collins, Colo.

Gentlemen:

I enclose the coupon in the last number of SCHOOL SHOP, with a few items marked and with 15 cents in stamps for item number 8. Thank you. I think SCHOOL SHOP is rendering fine service in many lines. It is a BIG little magazine.

BURL FRAMPTON
Director, Manual Arts
Memorial High School
St. Marys, Ohio

Gentlemen:

I am certainly pleased to be on the mailing list of the SCHOOL SHOP magazine. The vocational teachers of the country need just such a magazine to help coordinate and publish valuable ideas and projects. I hope I will be able to find time to contribute in the near future an article for your approval on helpful hints and projects for high-school teachers of machine shop.

H. EARL WRIGHT
Pershing High School
Detroit, Mich.

Gentlemen:

Your magazine is a "honey" for ideas.

The "Project of the Month:—Dies, Jigs, and Fixtures in the School Shop" on page 6 of the February issue has some good justifications for the use of dies, jigs, and fixtures more often in the schools.

I've applied at least one idea in each issue from the very first in my teaching.

BEN SHIMSHOK
Hatch Junior High School
Camden, N.J.

Gentlemen:

I am teaching in the Industrial Education Department at Miami University and have become acquainted with your new magazine SCHOOL SHOP. It has proven very helpful to me and I would appreciate it very much if you would put my name on your mailing list.

I wish to congratulate you on your very fine publication and sincerely hope that you may continue to carry on this very good work. Such a magazine gives to each of us the chance to broaden our knowledge and share the experiences of others.

JOHN E. SEEMAN
Miami University
Oxford, Ohio

Gentlemen:

I enjoy your magazine very much and have been able to use a lot of the material, as I am returning to teaching after a period of nine years.

NORBERT W. YOUNG
Pittsfield, Me., Schools

[Won't more of you write SCHOOL SHOP telling how *you* have applied material to your particular shop situation? Teachers the country over can profit from your experience.—*Ed.*]

Transparent Models in Teaching Drafting

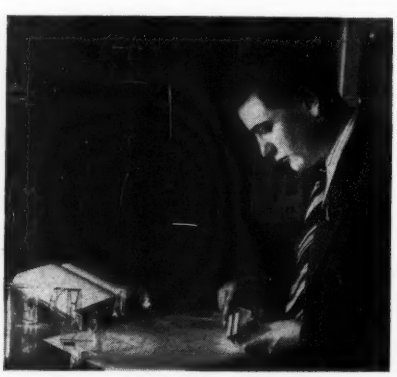
by F. N. Newton, Jr.

This is a description of how one drafting instructor makes his own transparent models out of plastacele. F. N. Newton, Jr., is Supervisor of Drafting, Sharon, Pennsylvania, Schools.

FOR a number of years I had considerable trouble in getting students to understand auxiliary views, developments, intersections, and transition pieces. I used various types of solid models made from soap, art gum, and clay in my demonstrations without much success. The main difficulty seemed to be in getting the students to visualize the hidden edges and the hidden construction of the figures.

Various models are available but are usually of solid construction, especially prisms, cylinders, pyramids, cones, etc. It is possible to get cut-away models, and cross-sectioned parts, but these are also of solid construction.

After much perseverance and experimenting with celluloid and isinglass I hit upon the product called plastacele. This is very transparent and comes in a variety of thicknesses, from 1/32" to nearly 1/8" thick. I now have several dozen models made from this material which I use for demonstration purposes. I have used these models now for several years in my teaching, and they practically eliminated all the headaches I used to have with this difficult part of drafting. These figures and their construction precede Descriptive Geometry taken by advanced students. If this subject is taught properly and is absorbed by students, the later difficulties of drafting, I have found, are handled much more successfully.



The first lecture begins with the use of the projection box, by which the method of third angle or orthographic projection is explained. This box is also made of plastacele.

Many trials, errors, and experiments ensued before the first satisfactory model was produced. I will try to give the method employed in making the models. I can assure any instructors who will take the time to make any of these models that they will help put across this phase of drafting.

Secure a sheet of 1/32" and 1/16" thick, plastacele. This is a Du Pont product and can be purchased from automobile accessory stores or direct from the Du Pont Company in Wilmington, Delaware. Next, get a tube of Megow's Kwik-Dri cement. This can be purchased from any store that handles model airplane kits.

Lay out a surface development of the model you desire to make, without laps, and thumb tack a piece of the plastacele over the development. Trace the development on the plastacele sheet using one

of the compass legs or a similar sharp pointed tool. If the lines are etched deeply enough, the pieces will break apart easily. You are then ready to assemble the various parts of the development.

Take any two adjoining parts and hold them in position at the proper angle and join with drops of cement at several points along the edge. After the pieces have been thus "tacked" together, hold the joint at an angle of approximately 60° and allow a drop or two of cement to run down the full length of the joint. Continue the operation until the sides of the model are completely fastened together.

Figure 1 shows a group of models made from plastacele.

Figure 2 shows the actual use of a model and shows how easy it is to visualize the hidden edges when examining a model made of this transparent material.

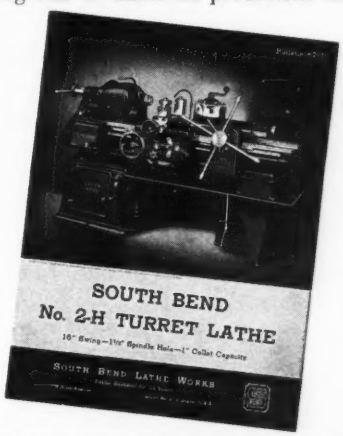
NEWS FROM industry

For items listed in this column, readers may address the firm named or write to News from Industry Dept., SCHOOL SHOP, Box 100, Ann Arbor, Michigan.

South Bend Markets New Turret Lathe

Turret Lathe No. 2-H has just been placed on the market by South Bend Lathe Works. The new lathe is described and specifications given in Bulletin No. 67-T.

This new lathe is adaptable to either long run or small lot production on a wide range of jobs. Spindle hole has a capacity of 1⅜", collet 1", and swing over bed and saddle wings 16".



The bulletin is a 4-page, letter-size condensed catalog which fully illustrates and describes the lathe and its various construction features. It will be mailed on request from South Bend Lathe Works, Dept. S-5, South Bend, Ind.

Special Kennametal Tools for Interrupted Cutting

Kennametal-tipped tools especially for interrupted cutting of steel castings and forgings in lathes, boring mills, and shapers have recently been designed by McKenna Metals Co., 274 Lloyd Ave., Latrobe, Pa. They are designed to speed production in machining armor plate and other irregular castings. These new Kennametal tools, with negative shear angle of 35° and positive side rake of 15°, will permit economies in machining irregular sections formerly realized only in simpler turning jobs.

The principle of these new tools, Kennametal styles 35, 36, 37, and 38, is that the interruption on the work first strikes the tool at a place back of the extreme point, where the cutting edge is mechanically strong, and then shears off the

Complete **SCHOOL SHOP** *Files Are Valuable!*

A complete file of SCHOOL SHOP is a valuable collection of projects and useful information for the shop teacher. SCHOOL SHOP will be glad to supply back numbers of any issue—beginning with the October, 1941 number—as long as the supply holds out.

Owing to the great demand for back copies, SCHOOL SHOP requests that all orders be accompanied with 25c in stamps or coin for each issue wanted. Special rates will be allowed for quantities of any one issue.

How to get a complete file:

1. **State the issues you do not have—beginning with October, 1941.**
2. **Enclose 25c (stamps or coin) for each issue wanted.**
3. **Address your request to**

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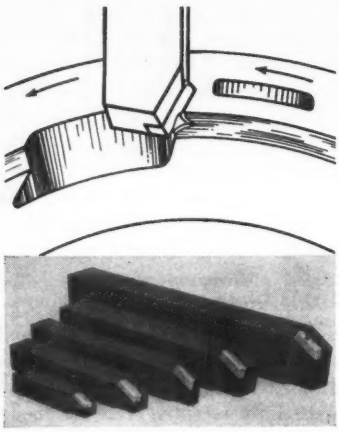


chip with a progressive action (see illustration). The tips are longer than on standard tools to compensate for the fore-shortening of the 35° shear angle; they project above the shank at the back to allow sufficient steel under the point.

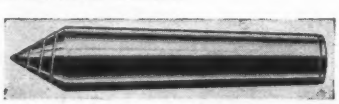
Plomb Tool Co. Adds to Plant

Scheduled for completion in early spring is a new addition to the plant of the Plomb Tool Company, Los Angeles. The new expansion, indication of all-out efforts of the company to meet increased hand-tool demands, is of multi-story steel and brick construction designed to house additional manufacturing space, and cafeteria and other facilities for employees.

The new plant will help Plomb accomplish its scheduled 1942 production, which is more than four times that of 1940—1942 production will exceed 9,133,000 tools, as compared with 2,216,000 in 1940.

'CMD' Helical-Groove Lathe Center

Chicago Manufacturing & Distributing Co., 1928 W. 46th St., Chicago, Ill., has recently introduced a helical-groove lathe center, for use in connection with its CMD center-point lubricants in preventing heating and expansion of work held between centers.



The left-hand spiral groove is cut so that a few drops of the center-point lubricant will be retained in the grooves and conveyed into the work thus dissipating heat generated by the work revolving and expanding. A uniform film of oil is maintained between the work and the center.

It is claimed that one application of CMD centerpoint lubricant is sufficient for one job, and that there is no need to stop work for further lubrication or adjustment of the tailstock. Samples of the lubricant and bulletins describing the centerpoint will be sent on request.

Wheel Dressing Book by Koebel

For Grinder Men Only is the name of a new booklet on the use of diamond wheel-dressing tools. Each page is devoted to one feature of grinding-wheel dressing, simply explained and illustrated. Nothing theoretical—written for the man on the job. Available on request from Koebel Diamond Tool Co., 9350 Grinnell Ave., Detroit, Mich.

Craftsman Supply Catalog of Plastics, Craft Supplies

Catalog shows complete line of plastics in workable shapes: rods, cylinders, castings, sheets, chains, letters. Also metal and plastics fittings, leather-craft items.—Craftsman Supply House, Scottsville, N.Y.

Test in Bench Metal Work

by **G. B. WESTERBERG, Dundalk, Md., Junior High School**

THE accompanying test has been found to be very useful as a check-up final in the general shop. It proves to be a check on retention of manipulative abilities as well as on the students' ability to understand a working drawing. It is suggested that the problem be used in the seventh or eighth grade but lowering the time limit to 30 minutes if used in the eighth grade.

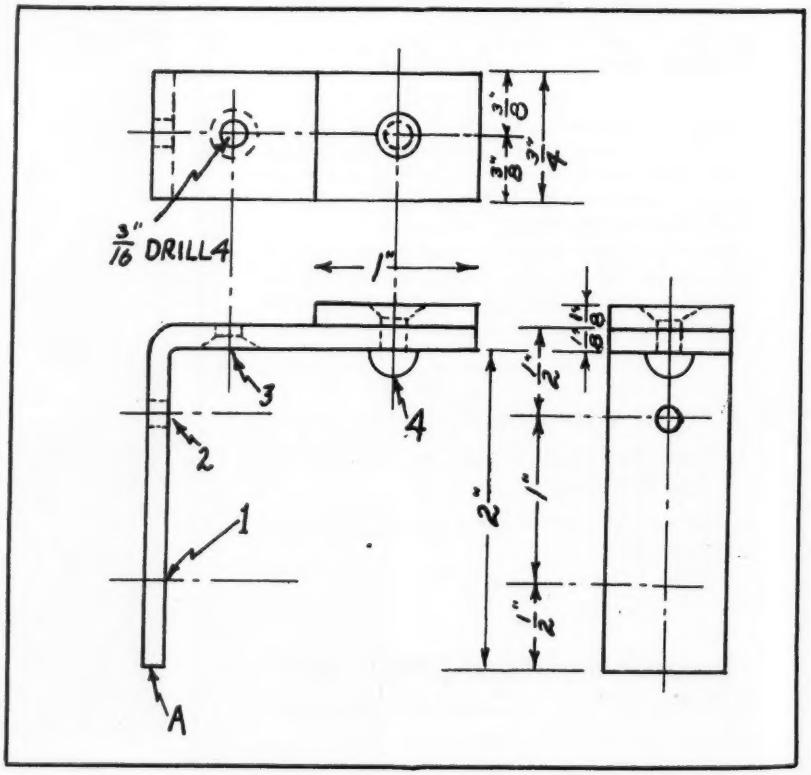
Directions for Test

Each of you will find at your bench a short piece of 1/8" x 3/4" band iron about 7½" or 8" long. The tools are in their usual places on the panels. Do not leave your bench except as necessary to obtain tools beyond your reach.

Make the article illustrated to the best of your ability following the working drawing and the directions below.

1. Cut to proper lengths and file end marked "A" square.
2. Center punch at points 1, 2, 3, 4.
3. Drill as indicated at points 2, 3, 4.
4. Countersink for No. 6 flat-head wood screw at point 3.
5. Countersink to flush 3/8" round-head rivet in lug at point 4.
6. Check carefully with print to make sure all instructions have been carried out.

Time: 40 minutes.



Mechanical Drawing + Psychology

by **KENNETH MAXWELL, Chico, California, High School**

A STUDENT frequently dislikes drawing because the plates are too long or too hard, and he becomes discouraged at his slow progress. The method we use in our school to overcome this apparently works successfully.

Instead of making out a list of plates for the students to do and then passing them when these plates are finished, the semester's work is divided into 17 units. Each Monday the students are given a new unit and are told to do as much as they can before the units are collected on Friday.

Each unit contains a reading assignment, a set of questions to answer, and a group of problems. The problems are graded in difficulty, the easy ones being first. The slow students take longer for their reading assignment and do only the easy problems at the beginning of the unit. The faster students quickly get the easy problems out of the way and do the harder ones.

By using this method the slower students are enabled to cover the same material as the faster ones. Since the policy in our school is to fail as few people as possible, this scheme makes it possible for the teacher to give a passing grade to the students who would probably otherwise fail. Our lowest passing grade has no value in college, so these people do not later become a college problem.

When a student is able to turn out several plates a week he has more of a feeling of accomplishment, because he can actually see his progress as the plates stack up. The slow students do not get an inferiority complex because they too are able to make a showing. The gap between the slow and fast students is not so evident because each Monday everyone is starting out on the same thing.

Lettering is taught in short practice periods independent of the weekly units.

The student's grade is figured by taking the average grade on his plates for the week, and averaging this with a grade which represents the number of plates he did. This gives him a grade on the particular unit. His semester grade is an average of the unit grades.

Since every method of teaching has its drawbacks, there will be situations where this method will be difficult. In advanced work in the second year it has not been found possible to pick problems that are short enough to use this method. In fact, the writer has even had some difficulty in selecting problems for the second-semester outline. For technical schools or where the drawing course has a definite trade aspect this method of presentation may not be suitable. However, for first-year students we consider this method quite successful in our school.

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What Do You Think?

What relationship do you have with organized labor in connection with your trade-training program?

▸ Says F. L. Allen, Director of Vocational Education, Saginaw, Michigan, Public Schools:

The reply is simple—only the most pleasant relationship exists. We are fortunate in Saginaw not to have difficulties with organized labor because over a period of the past 20 years we have worked together and have an understanding of each other's problems. Our cooperation is built up on a 50-50 basis.

Just two weeks ago we organized conversion national defense classes for the U.A.W.-C.I.O. at their request, for about 400 men. These men want action and you can't stall around with a group like that. It took us just two days to get all 12 classes in operation. One class started six hours after the organization meeting of the group took place. For the A.F. of L. we have our building trades apprenticeship classes.

Supplementary classes will be organized for any skilled labor group upon request. These classes are not necessarily closed classes.

▸ Says Franklin J. Keller, Principal, Metropolitan Vocational High School, New York City:

Under the general direction of the Advisory Board on Industrial Education, appointed by the New York City Board of Education, the Metropolitan Vocational High School has vital and amicable relationships with a number of unions, but especially with the National Maritime Union and with Local No. 802 of the American Federation of Musicians. President Joseph Curran is a member of our Maritime Educational Commission on which are represented all the principal American shipping lines and the chairman of which is Frank J. Taylor, President of the American Merchant Marine Institute. President Jack Rosenberg and Secretary William Feinberg of Local No. 802 are members of our Advisory Commission on Vocational Music, the Chairman of which is Mrs. Sam A. Lewisohn. Other members are such outstanding musicians and critics as Walter Damrosch, Deems Taylor, Olin Downes, Alfred Wallenstein, and Andre Kostelanetz.

The purposes of these commissions are to give expert and authentic advice on our courses of study in the maritime occupations and in vocational music, to help us to select competent teachers, to examine candidates for graduation, to advise on the purchase of supplies and equipment, and to assist in the placement of graduates. Their cooperation has not only been invaluable but has proved indispensable. The unions readily accept our graduates as members and help to place them in worthwhile positions.

Our experience has proved once again that when school people take labor into their confidence, call upon workers in the field to put their experience at the service of the schools and then put the results conscientiously to work in the interest of the children, the unions will cooperate heartily and effectively.

▸ Says J. E. Fintz, Director of Vocational Education, Cleveland, Ohio, Board of Education:

The Cleveland plan for apprentice training is one of reciprocity. Our policy is one of meeting actual needs through a program based on conditions as they are in each respective trade.

Since the beginning of our vocational program we have endeavored to set up programs for training workers only when such a program would have the backing of those who will employ the product of that training. Definite apprenticeship committees are established in each trade for which training is solicited to guarantee a committee purely representative of the trade for which training is requested in order that the school may have the complete backing of the employers and in the case of closed-shop trades, of labor unions with whom all workers of that particular craft are affiliated.

In our building trades committees we include representatives of the building trades employers' association, of the local contractors' association, and of the local unions. In case of an open-shop trade we include employing members, members from employment managers' groups, and any other representative which would tend to keep the committee on a balanced basis.

The functions of these various trade committees are as follows: to interview candidates for apprenticeship for the purpose of insuring a satisfactory educational foundation; to check physical conditions of prospective apprentices; to determine wage scales with automatic increases for satisfactory service during the period of apprenticeship; to make contacts with various agencies in order that they contribute their quota to the undertaking; to establish uniform indentureship agreements which are signed by the employer of the boy and by the parents.

In conclusion I might indicate that no vocational program can be effective without the actual participation of all parties concerned. We do not feel that we can operate a program on any arbitrary policy; neither could the Cleveland program of apprentice training be transplanted bodily to other communities since it is not possible to use an identical set-up for every trade.

Personalities . . .

HARVEY ADAMS, instructor for the past year in the industrial arts department of Ypsilanti, Mich., high school, has resigned to join the armed forces. His place has been taken by KEITH MORRISON, for the past five years at Lee High School, Grand Rapids, Mich. . . . R. A. PLOWMAN, formerly of Benton County School, Fowler, Ind., now teaches at Knightstown, Ind. . . . The Pennsylvania National Defense supervisory staff has been expanded by the addition of three persons: J. HERBERT KISSINGER, formerly of Reading vocational department, is now area coordinator of industrial education for the counties of Monroe, Carbon, Northampton, Lehigh, Susquehanna, Wayne, Lackawanna, Wyoming, and Berks; D. THOMAS MOORE, formerly director of vocational education at Clearfield, is now assisting in the administration of the Number One defense training program; and JOHN PROSSER, who taught auto mechanics at Penn High School, Harrisburg, is in the equipment division of the Number One program. . . . J. L. PERRIN, former state supervisor of vocational agriculture for Missouri, has been named special representative for the National Defense Training Program in the U. S. Office of Education. . . . GEORGE M. GAITHER has retired from active service as supervisor of industrial education of the Baltimore public schools. . . . WALTON J. TULLY, mechanical drawing instructor in Cooke Junior High School, Philadelphia, died last summer. . . . JOSEPH M. HOWLIN, printing instructor at New York School of Printing, was elected president of the New York Printing Teachers Guild at its December meeting, succeeding FRANK A. PRATT, Jamaica, N.Y., Vocational School. . . . E. W. FOWLER, former instructor in industrial arts at Amarillo, Tex., is now with State Teachers College, Charleston, Ill., as industrial arts instructor and critic teacher. . . . C. O. BANTA, former vocational director at Ottawa, Kansas, is now dean of vocational education at Trinidad, Colo., State Junior College. . . . HOLLIS DAHLOR, former industrial arts coordinator at Brentwood, Mo., is now director of defense training for the state of Missouri. . . . E. R. VIHEL is now with the industrial arts department of Arizona State Teachers College at Tempe. . . . New President of the Iowa Industrial Arts Association is LELAND BENZ, of Ames. . . . CHELSEA BAILEY, of Zanesville, Ohio, is now assistant to the director of the Federal Board for Vocational Education in Trades and Industries in Ohio. . . . MAURICE T. FREEMAN, for 28 years, head of the electrical department at East Technical High School, Cleveland, Ohio, died recently at the age of 59. . . . HARRY J. SCHLIERER, formerly with the New York branch of American Type Founders, is now eastern representative of Midland Chemical Laboratories of Dubuque, Ia. . . . new coordinator of apprentice training in Pontiac, Mich., schools is W. B. SIBLEY.

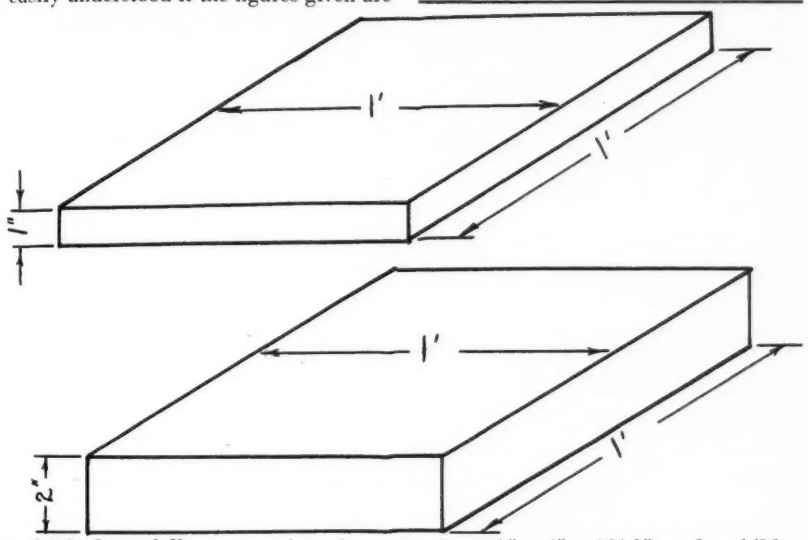
Mathematics for Woodworkers

UNIT II—ESTIMATING QUANTITY AND COST OF MATERIAL

by WILBUR D. HOPKINS

Here is the second unit on mathematics for woodworkers — on estimating quantity and cost of material. Wilbur D. Hopkins, author of both units (see SCHOOL SHOP, Feb., 1942, page 22), is instructor in woodworking at Schuyler High School, Albany, N.Y.

THE standard measurement for lumber is the *board foot.* One board foot or B. M. *(board measure)* is a piece of wood 1″ thick x 1′ wide x 1′ long. Board foot and board measure are one and the same thing. This formula is easily understood if the figures given are



multiplied as follows 1 x 1 x 1 = 1 B. M.

A piece of material 2″ thick x 1′ wide x 1′ long would contain 2 board feet or 2 B. M.

A piece of material 1″ thick x 1′ wide x 2′ long would contain 2 B. M.

1 x 1 x 2 = 2 B. M.

A piece of material 1″ thick x 6″ wide x 1′ long would contain ½ B. M.:

1 x 6/12 x 1 = ½ B. M.

A piece of material ½″ thick x 1′ wide x 1′ long would contain 1 B. M.:

1 x 1 x 1 = 1 B. M.

Rule:

For convenience and speed in estimating, all material less than one inch thick is figured as 1″ in thickness.

A piece of material 1¼″ thick x 1′ wide by 1′ long would be figured as follows:

5/4 x 1 x 1 = 1¼ B. M.

Rule for Figuring Board Measure:

Thickness in inches x width in feet x length in feet. Example:

2 pc. 1″ x 12″ x 12′-0″ equals 2 x 1 x 1 x 12 equals 24 board feet or B. M.

If the width or length is in inches they must be changed to feet by dividing by 12. Examples:

1 pc. 1″ x 6″ x 12′-0″ = 1 x 6/12 x 12/1 = 6 B. M.

1 pc. 2″ x 8″ x 30″ = 1 x 2/1 x 8/12 x 30/12 = 3⅓ B. M.

Lumber is always figured in rough sizes. The thickness, although given in inches, is never changed to feet because 1 board foot is a piece of stock 1″ thick.

Lumber is sold on the basis of 1000 feet board measure. When the cost is thus listed it is necessary to find the cost of one board foot by dividing the given piece by 1000.

Examples:

Oak at $250 M. B. M. (thousand board measure) would cost $.25 for 1 B. M.

White pine at $75 M. B. M. would cost $.075 for 1 B. M.

Thus to find the cost of material it is necessary to find the number of board feet and multiply by the cost of 1 B. M.

Example:

20 pc. 1″ x 10″ x 12′-0″ S. K. Pine at $95 M. B. M.

20 x 1 x 10/12 x 12 equals 200 B. M. x $.095 (cost of 1 B. M.) = .095

200

$19.000

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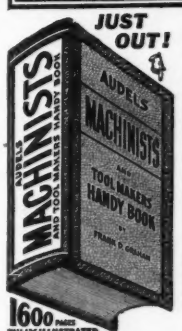

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instructional resources

Inquiries concerning materials described in these columns may be addressed to SCHOOL SHOP, Box 100, Ann Arbor, Mich., and will be passed on to the proper firm or person.

Books

Woodworking Workbook. Nichols and Stiles. Peoria: Manual Arts Press, 1942. Pp. 64. $0.68.

A workbook for woodworking classes containing preliminary remarks, study references, and questions and problems concerning information to be gained from the references. In six sections: preliminary lessons (safety, reading drawings, figuring board measure); woods and lumber; tools and elementary processes; wood fasteners; wood finishing; and problems. Well illustrated with photographs, drawings, and diagrams. Blank pages for notes and clippings.

Talmage Nichols teaches at Charleston, West Virginia, High School, and Harold L. Stiles at Tucson, Arizona, Senior High School.

Industrial Arts and the American Tradition. Boyd H. Bode. Columbus: Epsilon Pi Tau, 1942. Pp. 11.

This is a pamphlet reprint of an address given by Professor Bode at a meeting of Epsilon Pi Tau, honorary industrial arts society at Muncie, Ind., on November 1. Mr. Bode is professor of education, the Ohio State University, Columbus.

Advanced Mechanical Drawing. Klenke and Hayes. Scranton: International Textbook Co., 1941. Pp. xi + 316. $1.75.

A "companion piece" to *Elementary Mechanical Drawing* by the same authors and published in 1940. The advance text is for use in third and fourth-term mechanical drawing and includes development of surfaces, intersecting objects, fastenings used for machinery, tracing and inking, architectural drawing, photo-copying, and other related material. Drawings, index.

William W. Klenke teaches drawing at Central Commercial and Technical High School, Newark, N.J. Charles J. Hayes is head of the art department of International Textbook Co.

Shop Theory. New York: McGraw-Hill Book Co., Inc., 1942 (revised edition). Pp. x + 267. $1.25. Lithoprinted, paperbound.

This manual of shop theory was prepared by the shop theory department of Henry Ford Trade School, Dearborn, Mich. Chapters deal with all of the various methods of metal-cutting and finishing: sawing, filing, lathework, milling, shaping, planing, etc. Chapters also on decimal equivalents, formulas, small tools, rules, micrometers and gages, soldering, threading, gearing, heat treatment, and routing of bench tool work.

Illustrated with photographs, diagrams, charts, and tables.

Exploring the Arts and Industries. W. R. Williams. Scranton: International Textbook Co., 1940. Pp. ix + 275. $1.60.

The author has divided the "arts and industries" into five parts: communication and records; foods and clothing; shelter and housing; power and electricity; and travel and transportation. Within these categories, he traces the evolution of present methods and tools from their beginnings. In addition to informational content, related projects are included wherever possible. Well illustrated with photographs, drawings, and diagrams. Index.

Walter R. Williams, Jr., is development supervisor, Oberlin, Ohio, Public Schools. His book is one of the Arts and Industries Series, of which Dr. William E. Warner is editor.

Mathematics for the Aviation Trades. Naidich. New York: McGraw-Hill Book Co., Inc., 1942. Pp. x + 267. $1.80.

This book is intended to supply the necessary mathematical information for trade-school students planning to become aviation mechanics. In five parts: Part I, review of fundamentals; II, the airplane and its wing; III, mathematics of materials; IV, aircraft engine mathematics; and V, review. Appendix of tables and formulas; index. Diagrams, photographs.

James Naidich is chairman of the Department of Mathematics, Manhattan High School of Aviation Trades.

The Graphic Arts. Johnson and Newkirk. New York: The Macmillan Company, 1942. Pp. vii + 160.

An excellent book for the "graphic arts laboratory" which is becoming popular in junior high school industrial arts, as well as for the usual printing course. Printing instruction material is omitted which the teacher might more profitably provide himself, and the rest of the book is devoted to related graphic arts processes and background information. Included are chapters on type making and composition, presswork, wood and linoleum engraving, silk-screen printing, paper stock, duplicating, bookmaking, papermaking, and photography. Adding to the value of the book are projects for students, questions and references for each chapter, and an index. Illustrated.

William H. Johnson is superintendent of the Chicago schools; Louis V. Newkirk is director of the Bureau of Industrial Arts Education in the same school system and a member of the Editorial Board of SCHOOL SHOP.

Working of Aluminum Alloys. Pittsburgh: Aluminum Company of America. (Reprinted from "American Machinist," August 21, 1940.)

A 16-page folder covering the working of aluminum alloys: casting, forging, hot and cold forming, heat treatment, machining, joining, and finishing.

The monograph was prepared through the cooperation of the Aluminum Company and numerous makers of machine tools, lubricants, and coolants.

Flight: Construction and Maintenance. Wright, Dyer, and Martin. Chicago: American Technical Society, 1942. Pp. 259. $2.50.

A general survey of the principles of aviation and their application to aircraft maintenance. Chapters on blueprint reading, woods used in airplane construction, metallurgy, welding, construction, rigging, repair, and the propeller. Also quiz questions and answers, index. Amply illustrated.

Captain Bailey Wright is in the Private Flying Division of the Civil Aeronautics Administration; W. E. Dyer is instructor in charge of mechanics at Lewis School of Aeronautics, Lockport, Ill., and Rex Martin was formerly assistant director in charge of airways, Bureau of Aeronautics, Washington, D. C.

How To Read Aircraft Blueprints. Owens and Slingluff. Philadelphia: John C. Winston Co. Pp. 257. $4.00.

In three parts: I and II, on the fundamentals of blueprint making and reading; III, on application to the field of aeronautics.

Albert A. Owens is acting director, division of school extension, Philadelphia; Ben F. Slingluff is special assistant, division of industrial arts, in the same system.

Films

Handicraft Arts: Toys from Odds and Ends; Casting with Rubber Molds; Simple Block Printing; and Clay Pottery. Garrison Films, New York, N.Y. One reel each; 16 mm.; silent.

Elementary Operations on the Engine Lathe. 16mm., sound, 1 reel. Eastman Kodak Company, Rochester, N.Y.

A new sound film designed to assist in teaching lathe operation in connection with the national defense program. Procedures included involve facing, straight turning, squaring a shoulder, and working to dimensions from a mechanical drawing.

The Cover

On the cover this month is a student in electric arc welding in the national defense classes of Los Angeles City Schools, through whose courtesy the picture is printed.

Index to Advertisers

Armstrong Bros. Tool Co. 17
Atlas Press Co. 7
Audel Publishers 23
A. S. Boyle Co. 21
Chicago Manufacturing and Distributing Co. .. 13
Delta Manufacturing Co. .... Inside Front Cover
Education Digest ..... Inside Rear Cover
Kroch's Bookstores, Inc. 15
McGraw-Hill Book Co. 7
McKenna Metals Co. 17
Plomb Tool Co. 19
Sheldon Machine Co., Inc. 21
South Bend Lathe Works .. Outside Rear Cover
John Wiley and Sons 23

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